

S **C** I E N C E



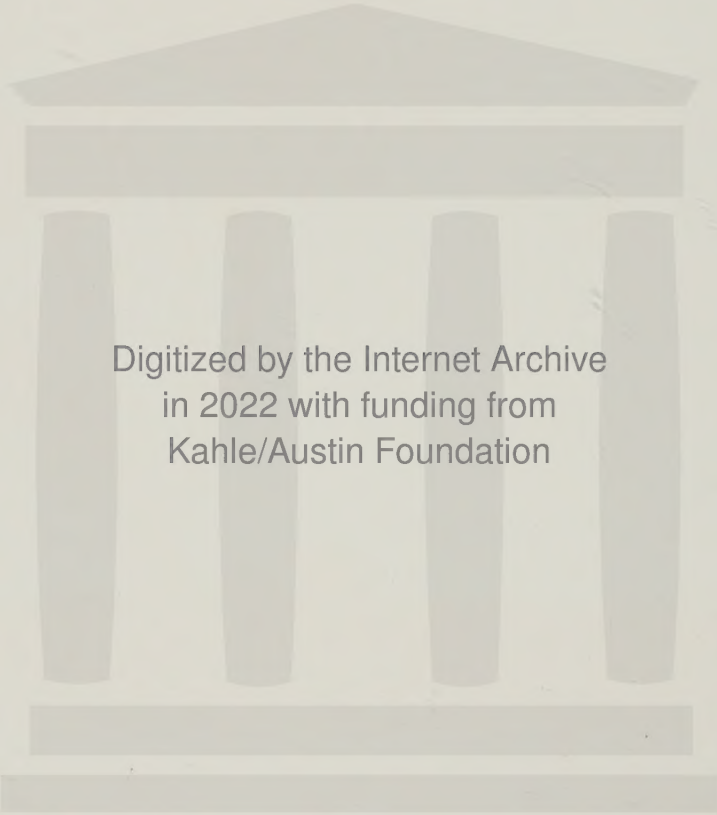
**BEAUTIES, HARMONIES, AND SUBLIMITIES
OF
NATURE**

WITH NOTES, COMMENTARIES AND ILLUSTRATIONS



Charles Bucke

Google
Print



Digitized by the Internet Archive
in 2022 with funding from
Kahle/Austin Foundation

[Faint, illegible text at the top of the page]

[Faint, illegible text in the upper middle section]

NATURE

[Faint, illegible text in the middle section]

[Faint, illegible text in the lower middle section]

[Faint, illegible text in the lower section]

[Faint, illegible text at the bottom of the page]

ON THE
BEAUTIES, HARMONIES, AND SUBLIMITIES
OF
NATURE;

WITH
NOTES, COMMENTARIES, AND ILLUSTRATIONS.

The sounding Cataract
Haunted me like a passion; the tall Rock,
The Mountain, and the deep and gloomy Wood,
Their colours and their forms, have been to me
An appetite.—WORDSWORTH.

BY CHARLES BUCKE,
AUTHOR OF "RUINS OF ANCIENT CITIES," &c., &c.

SELECTED AND REVISED
BY THE REV. WILLIAM P. PAGE.

NEW-YORK:
HARPER AND BROTHERS, CLIFF-STREET.

Entered, according to Act of Congress, in the year 1841, by
HARPER & BROTHERS,
In the Clerk's Office of the Southern District of New-York.

EDITOR'S PREFACE.

THE matter contained in the following pages has been taken from a work under the same name, in three volumes. This larger work is somewhat miscellaneous in its character, treating of many particulars but remotely related to the general subject. These have been excluded from the present edition, and such portions only have been retained as appeared to be strictly appropriate to the title of the book. The author's manner of writing is not a little peculiar, being discursive, abrupt, and irregular: at the same time, he abounds in interesting facts, in striking sentiments, and in beautiful imagery; in rich classical allusions, and in illustrations at once novel, and in a high degree impressive. Whoever reads this volume can hardly fail of deriving

Entered, according to Act of Congress, in the year 1841, by
HARPER & BROTHERS,
In the Clerk's Office of the Southern District of New-York.

P R E F A C E.

THE following pages were written in the privacy of retirement, amid scenes worthy the pen of Virgil and the pencil of Lorrain : scenes affording perpetual subjects for meditation to all who take a melancholy pleasure in contrasting the dignified simplicity of Nature with the vanity, ignorance, and presumption of man.

I have ever had an inclination towards the study of Nature, and found inexhaustible delight in the contemplation of her varied phenomena. Never do I behold a beautiful landscape, but it is fixed so firmly in my mind that I could write a description of it at any distance of time. The features of men I frequently forget ; those of the natural world, never.

Nature often speaks with most miraculous organ. " If I ascend into heaven," says the Hebrew poet, " thou art there ; if I

from it juster thoughts, and a nobler and purer love of Nature.

The subjects which are spread over the original work with seemingly little regard to order, have been more regularly arranged ; and such omissions and alterations generally have been made, as, without impairing or misrepresenting the author's views, seemed necessary to complete the design of this abridgment.

AM. ED.

New-York, October, 1841.

In youth the love of Nature is attended by lasting and most beneficial results : it contributes to encourage a taste for whatever is amiable in morals or captivating in art. And in mature manhood, when realities too much occupy the mind, without the enjoyments to be derived from this source the journey of life is as a weary pilgrimage.

Have we been tossed upon a bed of sickness ? How is our frame reanimated when, escaping from our chamber, we inhale the breath of morning ! All Nature renders us satisfaction ; while every object we see, and every sound we hear, are so many inspirers of that ardent gratitude which distends our breast.

If at any time the distress of the moment makes days of past affliction appear days of comparative happiness, and the sorrow of the present is too much for human infirmity to bear with constancy, let us contemplate the grand and impressive scenes of nature. Here the mind, elevated above those little cares which agitate the ambitious, the malignant, and the proud, looks up with rever-

take the wings of the morning, and dwell in the uttermost parts of the sea, even there shall thy hand lead me, and thy right hand hold me." The ocean—a solitude more solemn and awful than that of mountains, forests, or deserts—penetrates the soul with a spirit of devotion. Every agitation produces new beauty or new wonder; the miracles of the firmament are reflected in every wave; and in their unceasing restlessness we recognise an affecting emblem of the ever-onward progress of time.

When the Emperor Adrian, after traversing the whole of his vast empire, climbed the summit of Mount Etna, he confessed, with all the humility of philosophy, that this sublime pinnacle presented, at the rising of the sun, glories which gave him but a poor and contemptible opinion of his own imperial condition.

The rising and setting of the sun; the brilliancy of Orion in a night of autumn; and all the resplendent wonders of the starry firmament, awaken ideas of power and grandeur the most impressive and magnificent.

In youth the love of Nature is attended by lasting and most beneficial results: it contributes to encourage a taste for whatever is amiable in morals or captivating in art. And in mature manhood, when realities too much occupy the mind, without the enjoyments to be derived from this source the journey of life is as a weary pilgrimage.

Have we been tossed upon a bed of sickness? How is our frame reanimated when, escaping from our chamber, we inhale the breath of morning! All Nature renders us satisfaction; while every object we see, and every sound we hear, are so many inspirers of that ardent gratitude which distends our breast.

If at any time the distress of the moment makes days of past affliction appear days of comparative happiness, and the sorrow of the present is too much for human infirmity to bear with constancy, let us contemplate the grand and impressive scenes of nature. Here the mind, elevated above those little cares which agitate the ambitious, the malignant, and the proud, looks up with rever-

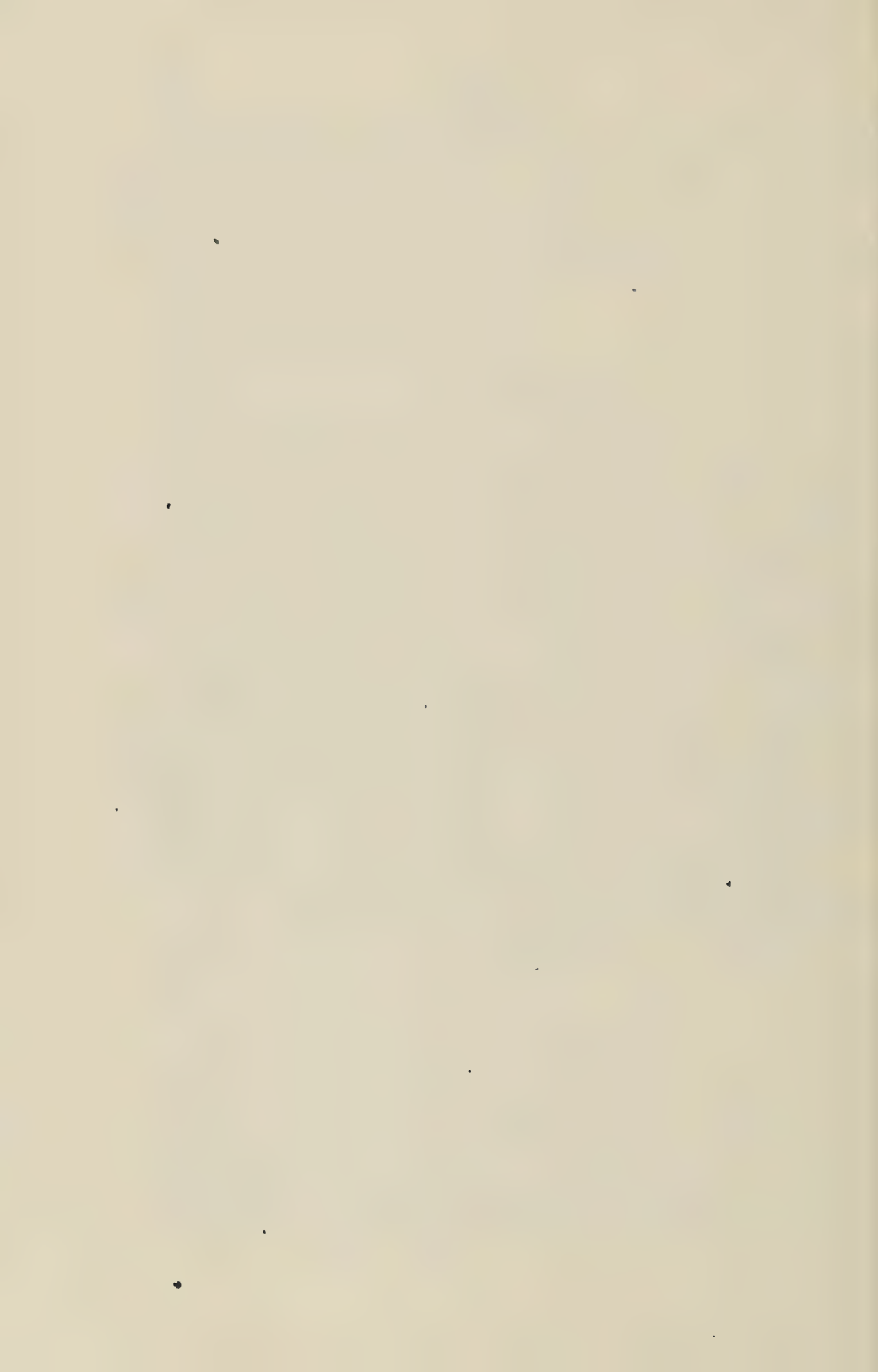
ential awe; while we feel new hope and confidence as we reflect that the God we behold in these magnificent monuments of power is a father to the fatherless and a friend to the friendless.

The sublime character of the scenery by which the monks of St. Bernard are surrounded, doubtless acts as a powerful stimulus to their benevolence, activity, and fortitude. Animated by a fervid charity which knows no fear, in the dead of night they will quit their convent, and, accompanied by dogs, and lighted only by lanterns, will grope their way over masses of ice to save a human being from perishing with cold, or from the more dreadful fate of sinking into gulfs from which it were impossible to rescue him.

What a charming picture has Fléchier given of M. de Lamoignon! "Why cannot I represent him to you," says he, "such as he was when he enjoyed repose after his labours in the court of judicature, at his retreat at Basville? There you might see him applying himself to husbandry, or raising his meditations to the invisible Deity by

the visible wonders of Nature : establishing the repose of a poor family on a tribunal of turf in a shady part of his garden, and then reflecting on the decisions he should pronounce relative to great interests on the supreme seat of justice."

No pleasures are so pure, and none so worthy the capacities of the human mind, as those derived from the study of Nature. And though nothing is entirely within our limited comprehension, yet, as things seen afford presumptive evidence in regard to things unseen, what more noble employment than to trace in the beauties, harmonies, and sublimities of the material universe those proofs of power, wisdom, and goodness which lead to the acknowledgment and adoration of the Supreme Architect!



CONTENTS.

	Page
The Ocean	13
Rivers	19
Fountains	29
Grottoes	34
Lakes	36
Waterfalls and Cataracts	40
Mountains	41
Valleys	51
Woods and Forests	54
Deserts	68
Storms and Tempests	75
The Rainbow	79
The Aurora Borealis—Zodiacal Light	84
Fata Morgana	88
Mirages—Electrical Appearances	90
Red Snow	94
Aërial Colours	96
The Seasons	101
Beautiful Sounds—Sublime Sounds	106
Echoes	112
Music of the Spheres	116
Language of Birds	117
Flowers	121
Vegetable Migration	133
Corallina	140
Bees	143
Ants	153
Influence of Climate	156

	Page
Characters and Habits of Animals	161
Adoration of Animals	167
Reasoning Faculty in Animals	169
Animal Changes	172
Analogies between Plants and Animals	177
Natural and Moral Analogies	181
Chymical, Atmospherical, and Vegetable Changes	187
Geological Changes	194
Astronomy	206
The Great—The Little	217
Plants in a Progressive State	221
Space—Motion	223
Views from the Planets	225
The Invisible Universe	226
Duration	227
Man comparatively a recently-created Being	245
Losses of Nature	246
The Intellectual Universe	265
The Trials and Caprices of Fortune	293
Smiles and Tears	296
Pleasure and Pain	303
The Great Change	307
Futurity	312

BEAUTIES, HARMONIES,
AND
SUBLIMITIES OF NATURE.

THE OCEAN.

Of all the objects in Nature, none strikes the soul with so much wonder, awe, delight, and solemnity, as the OCEAN.

There is a beautiful passage in Goëthe's ballad of the Fisherman, where he describes the pleasure which is derived from gazing on the sea : a passage which reminds us of that scene in Asia, where a plaintive harmony is heard in the air, arising from the waves of the ocean, beating beneath an atmosphere of unwonted purity. Quintus Curtius gives an account of the awe and apprehension of Alexander's soldiers when they first beheld the sea, near the mouth of the Indus ; and of their astonishment and alarm at observing the tide rising to the height of thirty feet : they, who had been accustomed only to the tranquil waters of the Mediterranean. When the Bedouin Arabs arrive at any of the Syrian ports, they never fail to express their rapture and amazement at beholding the sea for the first time ; and, with all the eagerness of admiration, they inquire what that "desert of water" means.

This vast collection of globules and fountain of vapour occupies more than three parts of the globe ; is the source of circulation and growth to all organized bodies, and the general reservoir of vegetable, animal, and mineral decompositions ; while the myr-

iads of animals it contains no pen can number. Neither can it enumerate the shells and plants, which grow to us invisible: some floating with the wind, others at the mercy of the waves; some secured to rocks and stones at the bottom, others rising to the surface; all receiving nourishment from its saline particles, and giving sustenance, in turn, to innumerable fishes, insects, vermes, and animalculæ. Thales was, therefore, not far from the truth, perhaps, when he said that the Deity formed all things out of water; nor Proclus, when he taught that the ocean was the cause of secondary natures of every description.

The influence of the sea on the poet Burns is thus described by Lockhart: "The magnificent scenery of Edinburgh filled him with extraordinary delight. In the spring mornings he walked very often to the top of Arthur's Seat, and, lying prostrate on the turf, surveyed the rising of the sun out of the sea in silent admiration." Crabbe, too, was no less charmed with the view of the ocean; and we are told by his son, that in the summer of 1787 he was seized one fine morning with so intense a longing to gaze upon the sea, that he mounted his horse, rode alone to the coast, 60 miles from his house, dipped in the waves, and then returned home.

With what delight did Victor Alfieri first behold the Mediterranean at Genoa and Leghorn! "The view of it," said he, "so much excited my wonder and admiration, that I was never weary of contemplating it;" and with equal pleasure did Euripides ascend the promontories of Greece, to look abroad on the liquid element, slumbering beneath the canopy of that matchless sky.

The Indian gymnosophists believed water to have been the primitive element; and Homer styles the ocean "father of all."

The Chewyan Indians of North America believe that the globe was originally one great mass of wa-

ter, with no inhabitants. A bird, however, they say, soon appeared above the waves, whose wings clapped thunder, and the flame of whose eye made lightning. Upon her touching the waters, the earth sprang up from them like an exhalation. After the earth appeared, she called every species of animals out of it: they came at her bidding; and this they believe to have been the original creation of the world.

This fable reminds us of a passage in Newton, where he says that all beasts, birds, fishes, and insects, trees and vegetables, grow out of water and watery tinctures; and that, by putrefaction, they return to watery substances again. Lister, too, imagined water to have been the original element, out of which all bodies, animate and inanimate, have emanated.

Still Nature's birth, enclosed in egg or seed,
From the tall forest to the lowly weed,
For beaux and beauties, butterflies and worms,
Rise from aquatic to aërial forms.—DARWIN.

Thales, as we have before remarked, thought that all things originally proceeded from the sea; and does not Moses imply the same, when he says that the Spirit of God moved upon the face of the waters, and that "out of the waters came forth the earth and all living creatures?" Philosophy of course rejects the fable of the Indians; but it inclines to the belief that the ocean is the eldest of terrestrial matter.

Dampier remarked in his various voyages, that where there were high shores there were deep seas; and that where the shores were low the seas were shallow. To corroborate this assertion, he instances the coasts of Galicia, Portugal, Norway, and Newfoundland, and those of Chili and Peru, all of which rise in rocks or mountains; and the seas are consequently deep.

On the other hand, the coasts of Panama, Campeachy, and the Bay of Honduras are low; as those

of China, Siam, Bengal, Coromandel, the north side of Malacca, Borneo, Celebes, and Gilolo ; and the seas there are shallow. Exceptions may occasionally be found to these rules, but they are just when generally applied.

In the Pacific, extending for thirty degrees each side of the equator, no tornadoes, typhons, hurricanes, or monsoons are known. In the equinoctial seas great variety has been observed in the colour of the water, and that, too, when no change could be observed in the atmosphere ; sometimes varying from gray to indigo, blue, and the deepest scarlet. The relative depths in some seas have been found unfathomable ; in others they vary in a most astonishing manner. In some parts of Baffin's Bay the depth is only 100 fathoms, whereas towards the shore the line sinks to 455. In Lancaster Sound, Captain Ross found a depth of 674 fathoms ; in Possession Bay, 1000 ; off Cape Cargenholt, 1005 ; and off Cape Coutts, 1050. Between Greenland and Spitzbergen the depth is unfathomable ; but La Place asserts that the greatest depth of the sea does not exceed eleven miles.

Here we may remark that the frigid zone of the north is occupied by land, ice, and water, while that of the south is almost entirely covered with water and ice ; and that, as the temperate zone of the north is chiefly occupied by land, that of the south is almost totally deluged with water. South of the tropic of Capricorn all is water, if we except New-Holland and its neighbouring islands, a small part of America, a still smaller part of Africa, and New-Shetland.

In regard to the relative temperatures of the ocean, Dr. Davy found the sea-water on the coast of England and that off the Cape of Good Hope nearly of the same specific gravity. Water taken up in the English Channel, of which a part must have been river-water, was 1077 : that under the

line no more than 1087. The common opinion that the sea is more salt at the tropics, is found not to be true. Franklin noticed that the water on the North American coast was different in and out of soundings; and subsequent observation leaves little room to doubt that the sea becomes colder in all countries the nearer it approaches the land. It is the same with rivers. The water in the middle of a river, except where it runs in a current, is always warmer than it is near the banks, and the part near the bottom colder than that at the surface. Rivers sometimes even freeze at the bottom, when at the top there is no appearance of ice.

I purposely abstain from the subject of the tides, as I am by no means convinced that our opinions on that subject are anything better than theories. The coincidences of the tides with the motions of the moon appear to me to be merely coincidences. The theory of lunar attraction is not sufficient, I think, to account for the varied phenomena presented; and I am the more confirmed in this opinion by the recent discovery of M. Daussey, that the height of the tides varies with the atmospheric pressure, they being highest when the barometer is lowest. Professor Oersted seems to entertain similar doubts, inclining to the opinion that the tides rise from some unexplained principle of circulation. *

Marine Deities.—The Greeks and Romans had the greatest possible horror of dying by shipwreck. They dreaded being dashed against rocks; of being devoured by fishes; and, above all, of being without the rites of sepulture. Hence the terror of Æneas, when he was in fear of his fleet being wrecked; hence Horace represents the spirit of Archytas addressing itself to a mariner, earnestly entreating him to strew sand over his body, which lay buried on the beach; and hence the Romans were accustomed, when they were saved from ship-

wreck, to hang up their wet clothes in the temple of Neptune, with an inscription, written on a table commemorating their escape.

The Mauritanian deities were chiefly divinities of the sea; and Dagon was worshipped in Syria under the shape of a sea-monster, "upward man and downward fish." The Carthaginians, and, indeed, the whole maritime pagan world, worshipped many gods; and the Romans sacrificed to them horses and bullocks, by throwing them into the sea. The Persians, however, had a great dread of the ocean. This feeling, continuing to the present time, has deterred them from all maritime enterprise. The profession of a sailor among them is looked upon with utter contempt; and Sadi carried his aversion to the sea so far as to exclaim, "I would rather give one hundred tomauns than pass over a single wave!"

Several tribes on the slave-coast of Guinea worship the sea as a deity; the natives of Great Britain believe it to be the seat of future bliss; and the Maldivians place a quantity of spices, flowers, gums, and odoriferous woods, in a boat every year and set it adrift on the waves, as an offering sometimes to the god of the sea, and at others to the spirit of the wind.

Marine Associations.—When the sea rises in mountains, "Ye carry Cæsar and his fortunes" naturally rushes into the mind. Then, too, is remembered Virgil's admirable description of a storm, excellent only by that of Falconer; St. Paul's shipwreck on the island of Malta; and Telemachus cast upon the island of Calypso. Then, the type of Jonah; or the Christian Messiah stilling the storm, and walking on the waves. Then, by the power of association, we recall that passage in Seneca where he says that, in the progress of life, childhood, youth, manhood, and age follow in succession, as objects pass before our eyes during a voyage; or we meditate on the truth of those similes which compare the instability of

res to the fickle resolutions of the people ;
 sea tossed by winds to an army agitated by
 ing passions.

son says that the sixth book of Paradise
 like a troubled ocean, exhibiting greatness
 sion, while the seventh affects the imagina-
 e the ocean in a calm. Young likens a man
 ast moments of life to a ship driven out to
 d Milton compares the hallelujahs chanted
 ultitude of angels, to the murmuring of its

Sachsins says the ocean has a circular
 like that of the blood ; and that the sea is
 s what the human heart is to the veins and

ancient writers peopled the sea with nymphs,
 hey styled Nereids. Beautiful is the passage
 r where he represents Thetis and the sea-
 ters sorrowing for the death of Patroclus,
 consequent grief of his friend : the mild
 the blue, languishing Alea ; and Amatheia,
 r amber-coloured hair ; all beating their
 and weeping in the silence of their grottoes.

are the paragraphs in the sacred writings
 ive of the ocean. In the Apocalypse, how
 the passage where a mighty angel is repre-
 s standing with one foot on the sea, the other
 land, and with his hand stretched towards
 ; or that other passage where St. John repre-
 mself as beholding a new earth and a new
 with the sea fading away from his sight.

RIVERS.

out rocks or mountains no country can be
 ; without water no landscape can be perfect-
 iful. Few countries are more mountainous,
 it better materials for the landscape painter,

than Persia ; yet it loses no inconsiderable portion of interest from its possessing but few springs, few rivulets, and fewer rivers. What can be more gratifying to a lofty and inquisitive spirit, than tracing rivers to their sources, through long tracts of country where sweep the Don, the Wolga, and the Vistula : the Ebro and the Douro ; the Rhine, the Inn, the Rhone, and the Danube ! or in travelling the banks of the Allier, so beautifully described by Madame de Sevigné ; or of the Loire, sleep-winding, and rolling by turns through some of the finest districts in all France ; where the peasant cottages, seated upon the sides of the hills, in the midst of their vineyards, resemble so many bird-nests ; and where the peasant girls, with their baskets of grapes, invite the weary traveller to help himself to as many as he desires : " Take them, say they, " and as many as you please ; they shall cost you nothing."

What traveller possessing an elegant taste but is charmed almost to rapture as he wanders along the banks of the Po, the Adige, and the Brenta ; or in Greece, amid the fairy scenes of the Eurotas, now shaded by rose-laurels, and once peopled, like the Cayster, with innumerable swans.

Delightful, too, were it to wander on the bank of the Jordan, where thousands of nightingales warble together ; or on those of the Tay, the Clyde and the Teith, where the culture of bees forms a considerable object of rural economy. How is our fancy elevated when we traverse, even in imagination, those savage solitudes and luxuriant wilds enlivened by the humming-bird, through which the Orinoco and the Amazon (rivers, to which the proudest streams of Europe are but as rivulets) pour their vast floods. The Mississippi—what grandeur in the very name ! In its course along the continent it is fringed with immense trees, frequently adorned with a gray mossy mantle, descending /

stoons from the summit to the root, and, flowing to the ocean, it preserves its freshness and its colour three leagues from shore.

Sacredness of Rivers.—"Where a spring rises or a river flows," says Seneca, "*there should we build altars and offer sacrifices!*" In pursuance of this idea, most nations, whether barbarous or refined, mistaking the works of Deity for Deity itself, have, at time or other of their history, personified their rivers, and addressed them as the gods of their idolatry. The Indus and the Nile, the latter watering regions that knew not its origin, and kingdoms which were ignorant whither it flowed, were both worshipped in the respective countries which they fertilized. The Abyssinians call the Nile by a name signifying giant; and Vespasian placed in the temple of Peace a large block of basalt representing a figure, with sixteen children playing around it.

Alexander, previous to sailing down the Hydaspes and the Sinde, invoked them as deities, and from the prow of his ship poured libations into their realms from golden goblets. The Jews held in the highest veneration Siloa's brook, that flowed "fast by the Oracle of God." Varro invokes water as a deity. The Adonis was esteemed sacred by a great portion of western Asia; the Peneus was adored for its beauty; the Danube for its magnitude; and the Achelous for its solemn traditions. The Phrygians worshipped the Marsyas and Meander; the Trojans the Scamander; the Druids the Dee; the Massagetæ paid divine honours to the Palus Mæotis and the Tanais; the Celts peopled their rivers with subordinate deities; and water is still worshipped by the natives of Multanistan.

The ancients attributed many fictitious properties to rivers. Some were said to make thieves blind; others to injure the memory; and Josephus even mentions seriously a river in Palestine, which, in compliment to the Sabbath, rested every seventh

day ! Rivers are held sacred, too, in China ; find the emperor, in one of the Peking gazettes, pressing his gratitude "to the God of the Yel River" that no accident had occurred in consequence of its having overflowed its banks.

The ancient Persians never polluted water, considering those who committed such indecencies guilty of sacrilege ; and they enacted a law, that whoever conveyed the water of a spring to a spot which had not been watered before, besides other immunities, his descendants should enjoy the benefit of such water to the end of the fifth generation. The custom is still observed, and the day on which it is first introduced is a day of rejoicing among the peasantry : a fortunate hour is appointed for its being let loose ; shouts of joy are heard, and exclamations of "*may prosperity attend it,*" echo from every side. In ancient times their kings were prevented by the laws from drinking any water but that of Choaspes, which was carried in vessels of silver wheresoever they went. Elian relates that Alexander was once nearly perishing with thirst for the water of it ; and when the Persians conquered a city, they summoned one to surrender, they required the king or magistrates to send earth and water as tokens of submission.

So general, indeed, is the reverence for rivers that there is scarcely one in any part of Europe that is not regarded with more or less of this feeling by the natives of the districts through which they flow. Of the affection and veneration of the Indians for the Ganges, Stavorinus mentions several curious instances ; and one not a little strikingly occurred. When Nuncomar, first minister to Mier Jaffiere, was executed during the administration of Warren Hastings, the multitude who were present at his death, looking upon it as an ill and barbarous act, ran to the Ganges to wash away the pollution of having witnessed it.

oos believe that, though the earth will be de-
ed, this river will remain to eternity ; and that
supreme Power, in the days of perfect felicity,
recline upon the leaf of a *pisang*, rapt in ec-
: meditation, with two *betel* plants floating on
osom of its waters.

ciently it was the custom to raise funeral mon-
its on the banks of rivers. Memnon offered
a hair to the Nile; the Assyrians cut off theirs,
hrew it into the lake near Argyrium, as an of-
g to Hercules ; and Peleus vowed that he would
rm the same ceremony in the event of his
returning from Troy covered with victory.

Sperchius ! whose waves, in mazy errors lost,
Delightful roll along my native coast !

To whom my father vowed at my return,
These locks to fall and hecatombs to burn.

HOM.—Iliad, xxiii.—POPE.

e Cingalese worship the Mahavillaganga ; the
uns venerate the Tappi ; and a character of so
sacredness is attached to the Tumrabunni, that
nerable devotees annually resort to the grand
act of Puppenassum, among the mountains of
ively, and return to the most distant parts of
, laden with the waters of the holy stream.
Hurdwar, too, is esteemed sacred over a large
on of India ; and more than 15,000 persons are
ally employed to carry it in flasks, tied to the
of bamboos and slung over their shoulders, to
es and families of distinction, who use it at
s, but chiefly on religious occasions.

was Brahma who first taught the Indians to
hip rivers. Their affection for the Ganges is
even at the present day, that many hundreds
em have been known to go down to it, at cer-
periods of the year, to devote themselves to the
t, the tiger, or the alligator, thinking them-
s happy, and their friends fortunate, thus to be
itted to die in or near that sacred stream.

They believe it to issue from the foot of a goddess, and that the deities themselves take delight in seeing it flow. Near the source of one of the branches of the Ganges is a temple dedicated to I chandra. This temple, the Brahmins living near insist, has been in existence upward of 10,000 years. One part of the duty of these Brahmins is daily to feed the fish, which are so tame as to suffer themselves to be handled. At the point where the united streams of the Ganges first enter the plains of Hindustan, there is a meeting every twelfth year, for the double purpose of holding a fair and bathing in the stream. The multitudes assembled on these occasions are incredible. They pour in toward the end of the festival from all parts of India: Captain Raper reckons their number at two millions and Colonel Hardwicke at two millions and a half. They bring their own provisions with them; and the festival is called the "Mela."

The Ganges issues from a bed of snow, above its outlet hang large masses of icicles. The width of the stream is twenty-seven feet, its greatest depth eighteen inches, and its shallowest eight inches. Here the Ganges first sees the sun, at a height of 12,914 feet above the level of the sea.

The Siamese once worshipped the Meinam; the ancient Gaurs enacted a law prohibiting any one from sailing on rivers; and the Shastah directs frequent washings in rivulets, and frequent pilgrimages to distant streams. The Cashmirians believe that they derive all their comeliness from the purity and brilliancy of their rivers and springs, and the ancient Indian kings were accustomed to throw bulls and black horses into the Indus at the time of its overflow. Many Tartar tribes, particularly those that trade to Astrakhan, worship water, which is always kept ready in a large marine shell; and, like the Icelanders, they always take off their shoes before they pass a river, and never fail to render thanks for their safety after they have crossed.

Poetical Allusions to Rivers.—Rivers have, in all ages, been themes for the poet ; and in what esteem they were held by ancient writers, may be inferred from the number of authors who wrote of them before the time of Plutarch. The Aufidus, the Tiber, and the Po have been celebrated by Horace, Virgil, and Ovid ; Callimachus has immortalized the beautiful waters of the Inachus ; and while the Arno, the Mincio, and the Tagus boast their Petrarch, Boccaccio, and Camões, the Severn and the Trent, the Avon, Derwent, and Dee, have been distinguished by the praises of many an elegant poet.

Ossian was never weary of comparing rivers to heroes ; and so enamoured were Du Bartas and Drayton with river scenery, that the one wrote a poetical catalogue of those which were the most celebrated, and the other composed a voluminous work upon their history, topography, and landscapes. De Lille directs us to rear the monument of a friend on the banks of a river, since, lulled by the music of waters, he will enjoy a more pleasing slumber than in the midst of an assemblage of tombs of marble. Camões fancies the nymphs of the waters we have often seen him strolling by moonlight along the green shores of the Tagus ; and beautifully pathetic is the passage in a small ballad of Logan, where, describing the wanderings of a mother and sister, the poet heightens the solemn simplicity of the scene by alluding to the sound of the stream it flowed through the forest.

His mother from the window look'd
 With all the longing of a mother ;
 His little sister weeping walk'd
 The greenwood path to meet her brother :
 They sought him east, they sought him west,
 They sought him all the forest thorough,
 They only saw the cloud of night,
 They only heard the roar of Yarrow !

Ablutions.—Bathing in rivers and seas is a great luxury in warm countries. The Otaheitans bathe

frequently, and the negroes of Ardrah wash twice a day, and perfume themselves with aromatic herbs. To the former, the most favourite of all amusements is bathing; and the higher the surf of the ocean, the greater is the diversion. The natives of the Sandwich Islands, also, are such excellent swimmers, that a canoe with a woman and her children being upset, Captain Cook observed a child of four years old swimming about it, apparently highly delighted, till it was restored to its upright position.

Ablutions were frequently practised among the Jews, the Sampsœi, the Greeks, and the Romans. The Gentoo women bathe in a stream before they sacrifice themselves on the funeral pikes of their husbands; and the custom of immersing newborn infants in rivers and fountains, which prevailed in Syria during the reign of Antiochus, exists in many parts of India, Turkey, and China. The Mexicans, in the same manner, bathe their children as soon as they are born. In performing this ceremony, the midwife says, "Receive the water; for the goddess Chalciuhcueje is the mother. May this water cleanse thee from the spots which thou bearest from thy mother, purify thy heart, and give thee a good and perfect life!" In another part of the ceremony, she says, "May the invisible God descend upon this water, and cleanse thee of every sin and impurity, and free thee from evil fortune!" Then, "Lovely child! the gods have created thee in the highest place of heaven, in order to send thee into the world; but know that the life on which thou art entering is painful and full of misery; nor wilt thou be able to earn thy bread without labour. May God assist thee in th many adversities which await thee!" The whole ceremony is curious and interesting; and for farther information the inquisitive reader may consult the History of Mexico, written by the Abbé Clavigero. The Brahmins of Hindustan bathe their newborn children in like manner. Having washed

ld with water, a relation holds the point of a pen
its forehead, and prays the Deity "to write good
gs thereon." He then makes a mark with red
tment, saying, "O Lord, we present this child,
n of a holy tribe, to thee and thy service. It is
nsed with water and anointed with oil."

A custom prevailed in the fourteenth century,
ong the women residing on the banks of the
ine, of assembling on a particular day of the
r to wash their hands and arms in that river,
dly flattering themselves that such lustrations
uld preserve them from all dangers and misfor-
es during the remainder of the year. This cere-
ny, witnessed by Petrarch, gave him great satis-
tion. "Happy," said he to himself, "are these
men, since their river runs away with all their
eries. Ah! happy should we be in Italy if the
er and the Mincio possessed the same virtue.
ese fortunate people waft all their misfortunes on
bosom of their river to the English: we would
ingly present ours in the same manner to the
ors of Africa, if our rivers would only bear the
den; but they will not."

Historical Associations.—Many and deeply affect-
are the associations connected with rivers.
h the Nile we associate the rebuke of Apollo-
s of Tyana to the cruel natives of Egypt.
everence the Nile," said he; "but why do I men-
the Nile among men who prefer measuring the
g of blood to the rising of water?" Are our
ghts turned to the SENEGAL? So beautiful are
banks, that we may fancy that we are gazing
n the primitive simplicity of the first parents of
kind; blooming, as it were, in the morning of
ire. To the CYRUS? In a barge, whose poop
of beaten gold; whose oars were of silver,
ed to the melody of flutes; and whose purple
were scented with spicy odours, reclines the
rious Cleopatra, in a pavilion covered with silk.

On each side of her stand boys, like cupids, far her with various-coloured fans, while delicious fumes pervade the vessel. Antony sups with queen; she wins his heart, and he loses the of the world!

Does the classical stranger stand on the bank the Issus? He is reminded of that battle in which the Persians lost 10,000 horse, 100,000 foot, 40,000 prisoners, while Alexander lost but 450 diers. In this decisive battle the Macedonian monarch took Sisygambis, the mother of Darius, prisoner: she who afterward slew herself on the breast of her conqueror, having already witnessed the death of her husband and eighty of her brothers, the destruction of her son, the loss of an empire, and the ruin of her subjects.

The TIBER! Who is not alive to the splendor of its ancient glory? And what a contrast is created by its present condition? "Its destiny," says a French traveller, "is altogether strange. It passes through a corner of Rome as if it did not care. No one deigns to cast his eyes towards it; no one speaks of it; no one drinks its waters; and women do not even use it for washing. It is a way between the paltry houses which conceal it and hastens to precipitate itself into the sea, ashamed of its modern appellation—*Tevere*."

The VISTULA! It is immortalized by the death of Vanda, duchess of Poland. Vanda was the beautiful and accomplished princess of the country in which she lived. Rithogar, a Teutonic prince, hearing of her fame, despatched an ambassador to command her in marriage, with orders to declare war if she should refuse his offer. This rude manner of courtship not pleasing the duchess, she prepared for war. Vanda marched at the head of her troops, and encountered Rithogar on the banks of the Vistula. The soldiers of the prince fled at the first onset; and thus losing the battle, Rith

soon after slew himself in despair. Vanda, in the mean time, mourned the victory she had gained; for, having beheld Rithogar, she had become enamoured of him; but her nobles prevented their union. Upon learning the fate of her lover, Vanda threw herself into the Vistula, and her name was given to the country afterward called Vandalia.

FOUNTAINS.

Not only rivers, but FOUNTAINS, have been held sacred by almost every nation; and equally beloved are they by the poets. Who has not read with delight Sannazaro's ode to the fountain of Mergillini; that of Fracastorius to the spring near the Lake di Garda; and that of Horace to the fountain of Blundusium? When Petrarch first beheld that of Vaocluse, in company with his father and his uncle Settimo, he was, though a boy, so enchanted with it, that he exclaimed, "Were I master of this fountain, I would prefer it to the finest of cities."

There is something venerable in the very name of fountain. We say "the fountain of life" and "the fountain of knowledge;" and the image of Truth (the daughter of Time and the mother of Virtue) is fabled to have been first discovered at the bottom of a fountain, clad in a white robe, of a symmetrical form, and of a mild, modest, diffident, and attractive countenance. Truth! "Of all the divinities that nature has discovered to the mind of man," says Polybius, "the most beautiful is Truth. Her power is as great as her beauty. For, notwithstanding all conspire to overwhelm her, and notwithstanding every artifice is employed by her adversaries, espousing the cause of Error to effect a conquest over her, yet, I know not how it is, she ever fails by her own native force to make her

way into the human mind. Sometimes she displays her power immediately, sometimes only after having been a long time enveloped in darkness. nevertheless surmounts every opposition, and triumphs over every error by her own essential energy." She is, as a Hebrew writer sublimely expresses it, "the strength, kingdom, power, and majesty of all ages."

Poets and other writers have the most agreeable associations in respect to fountains. Homer compares Agamemnon shedding tears to a fountain trickling from a solid rock. Love has been called a spring perennially flowing with delight; Marcus Aurelius desires us to look within, as there is a fountain of good; and Akenside, alluding to the faculties of the mind, exclaims,

"Mind, mind alone : bear witness earth and heaven !
The living fountains in itself contains
Of beauteous and sublime."

Lucretius associates fountains with his splendid ordium, and Aristotle called those of the Greek Archipelago "cements of society;" for there the young women were accustomed to meet every evening, and, while one drew water, another supplied, and a third accompanied : then all the maids of the village followed in chorus, and the evening frequently closed with a dance.

De Pagès assures us, that the most beautiful subject for a painter in the East is that of a young female on her way from a fountain; and one of the best pictures of Raphael is that which represents the servant of Abraham meeting Rebecca at a well. Berghem has a picture representing peasants driving their cattle to a fountain at the first glow of evening, and Gaspar de Witt has a beautiful landscape animated by hunters halting at a well. The most celebrated painter of fountains was Dubouché of Bois-le-Duc.

One of the most remarkable fountains in ancient times was that of which Herodotus has given an account. It was called "the Fountain of the Sun," and was situated near the temple of Jupiter Ammon. At the dawn of day this fountain was warm; as the day advanced, it became progressively cool; at noon it was at the extremity of cold; and at this time the Ammonians made use of it to water their gardens and shrubberies. At the setting of the sun it again became warm, and its temperature continued to rise till midnight, when it reached the extremity of heat; while, as the morning advanced, it gradually cooled. This fountain is also described by Quintus Curtius, Diodorus Siculus, Arrian, and Solinus: Sil-
 ius Italicus likewise alludes to it.

There was a fountain equally curious in the forest of Dodona. It is said to have had the power of lighting a torch: at noon it was dry; at midnight full; and from this time it decreased till the succeeding noon. A similar one is mentioned as being near Grenoble.

The celebrated Castalian fountain rushes from two precipitate rocks, and forms several romantic cascades; and Cashmere is said to abound in fountains, which the natives call "miraculous." Pliny the younger describes one near the Larian Lake, which increased and decreased three times every day: it still exists.

Properties ascribed to Fountains.—The ancients were never weary of attaching peculiar properties to fountains. That of Arethusa was supposed to have the power of forming youth to beauty, and that at Colophon of enabling the priest of the Clavian Apollo to foretell future events. This oracle was visited by Germanicus in his progress through Asia. The priest inquired his name; then, descending into a cavern in which the secret spring was, he drank of it; and, returning to Germanicus, recited two or three verses predicting the premature

death of that illustrious prince. Pliny mentions this spring, and asserts that whoever drank of it died soon after.

Of medicinal and detrimental fountains we have many instances vouched for by writers modern as well as ancient. Philostratus mentions one that occasioned leprosy. Vitruvius speaks of another, near Zama in Numidia, that gave unwonted loudness to the voice; while the Macrobian Ethiopians, living, it was said, to the age of 120, their longevity was ascribed to their bathing in a fountain, which perfumed them with an oil which had the odour of violets. We read of some that caused immediate death, some the loss of memory, and others that restored it. Plutarch relates that there was one called Ciffusa, which being of a bright colour and of an exceedingly pleasant taste, the inhabitants of the neighbourhood believed that Bacchus had been washed in it immediately after his birth. It had something of the flavour of wine. Many of these have doubtless a fabulous origin, yet it would be too presuming to discredit all that is related of them. Marcellinus, however, takes no little latitude in describing a fountain called the water of oaths. "Its source," says he, "is cold; and yet it bubbles like boiling water, and possesses a faculty of ordeal in respect to truth and falsehood."

In Epirus was a fountain, which at the last quarter of the moon was so much impregnated with sulphur that it kindled a piece of wood when put into it; and in the palatinate of Cracow there is a spring, which, upon applying a torch, burns like spirits of wine: the flame dances on the water, but it does not heat it. Pliny also speaks of two, one in Judea, the other in Ethiopia, which, being impregnated with sulphur, had the property of oil in respect to burning. Some writers mention a fountain rising in Mount Socrates, the waters of which boiled at the rising of the sun. In Greenland most of the springs

And fountains rise and fall with the tide. Many in Spain, in England, and in Wales have similar periodical returns; and under the rocks of Giggleswick, the West Riding of Yorkshire, there is a well that ebbs and flows several times in the course of an hour: when the weather is very wet or very dry, it ceases to flow.

Naming of Fountains.—Among the Romans, no person was permitted to bathe near the head of a stream, as the body was supposed to pollute consecrated waters. In the middle ages, the common people, where fountains and wells were situated in sacred places, were accustomed to honour them with titles of saints and martyrs. Some were called Jacob's Well, St. John's, St. Mary's, St. Winifred's, and St. Agnes': some were named after Mary Magdalen, and others derived their appellations from beautiful and pious virgins. Though this custom was forbidden by the canons of St. Anselm, many grimaces continued to be made to them; and the Germans long retained a custom of throwing nose-rings into fountains, and chaplets into wells. From this practice originated the ceremony of sprinkling the Severn with flowers, so elegantly described by Spenser, and so beautifully alluded to by Milton:

"The shepherds at their festivals
 Carol her good deeds loud in rustic lays,
 And throw sweet garland-wreaths into her stream,
 Of pansies, pinks, and gaudy daffodils."

The Hindus frequently sprinkle flowers on the face of those streams in which they perform their religious duties; while on the Lake Masanawara, north of the Himalaya Mountains, the Tartar shepherds scatter upon its surface the ashes of their relatives.

GROTTOES.

THE names of deities were given to Grottoes well as to fountains. The serenity of an Italian sky rendered those occasional retreats peculiarly agreeable to the Roman nobles: hence they were commonly found in the shrubberies and gardens of that extraordinary people. The poets, at all times ready to celebrate whatever added to their pleasures, have left us some beautiful descriptions of those recesses, formed in the sides of rocks, at the base of mountains, or on the banks of rivers. Many of these still remain in Italy, containing multitudes of small paintings, representing vases, tools, leaves, butterflies, shells, and fruits.

Pausanias gives an account of a remarkable grotto at Corycium, and Statius describes one that is very curious; but the one most celebrated in ancient times was the grotto of Egeria, still existing, though in a state of ruin. When this grotto was first excavated by Numa, it was formed with such simplicity, to appear without the smallest traces of art; in the reign of one of the emperors it lost its simplicity, and, being adorned with marble and other splendid ornaments, acquired a magnificence wholly at variance with its original character. This provoked the satire of the indignant Juvenal; now, however, said to have returned to its primitive simplicity, being adorned with moss, violets, strawberries, honeysuckles, and hawthorns.

The grotto formed by Pope at Twickenham is one of the most celebrated ever constructed in England. In the first instance, it was remarkable for its elegant simplicity. As the owner advanced in years, however, it became more and more indebted to the refinements of art; but the recollection of its humble origin amused the declining years of the illustrious patron, and atones to the heart of the philanthropist for what

lost to the eye of taste. The inscription he wrote for the fountain in this grotto seems to have been conceived from the following laconic fragment :

• “*Nymphæ . loci . bibe . lava . tace.*”

Gaffarel, librarian to Cardinal Richelieu, wrote a history of all the vaults, mines, caves, catacombs, and grottoes which he had visited during his travels of thirty years : the principal grottoes were that of Pausilippo ; that of the serpents, near Civita Vecchia ; the Witches' Grotto, near the Ganges ; those in the Highlands of Scotland ; on the banks of the Onon and Yenisei, in Siberia ; the bone-caves in Egypt ; the yellow cave in the valley of Alcantara ; that of Pilate among the Alps, as well as those of Bruder Bahn and of Glaris ; those of the Carpathian Mountains, and the Dragon's Cave in the landgravate of Hesse Darmstadt, and the immense caverns at Alcantara, near the city of Lisbon.

In natural grottoes it is that we occasionally find the most beautiful specimens of spars, while artificial ones are not unfrequently decorated with shells worthy the residence of Doris and the Nereids.

The first race of men are represented by the ancient writers to have been born and to have resided in caves and grottoes. Such were the dwellings of the Cimmerians, to whom Homer and Herodotus so frequently allude.

And here we may remark, that in Russia there is a cave so large as to contain several subterranean lakes, while the Mammoth Cave of Kentucky is from six to nine miles in length. The grotto of Antiparos, however, one of the Cyclades, is the most celebrated, on account of its remarkable petrifications, the island in which it is situated being a rock of marble sixteen miles in circumference.

LAKES.

FROM rivers, fountains, and grottoes, let us to LAKES. Those of Switzerland present so many features of beauty and grandeur, that an idea of something peculiarly worthy of admiration presents itself when we hear them mentioned.

How often have I heard you, my Lelius, dwell with rapture on the lakes of Cumberland and W. moreland; on those of Loch-Lomond, Loch-L. and Killarney; those of the Arkansas,* and the more noble and magnificent ones of Switzerland. With what delighted attention have I listened to your descriptions of the lakes of Thun, Zurich, Neuschâtel, Brientz, Bienne, and Constance; how has my imagination kept pace with you, as you have wandered in memory among those enchanted regions: regions abounding in scenes which Wordsworth might have pictured as the native residence of fancy.

SULZER, born at Winterthun, in the canton of Zurich, rich, animated by the example of Gessner the naturalist, lived to produce two works, of which his country is justly proud: a History of the Fine Arts, and Moral Contemplations on the Works of Nature. He was charmed with the splendour of the material world, he lived innocently and contentedly, and at last died in so placid a manner that his friends for some time doubted whether death or sleep had suspended his conversation.

* The lakes near the Arkansas, in the valley of the Mississippi, are covered with the flowers of the *Nymphaea nelumbifolia*, the external leaves of a brilliant white, and the internal of a beautiful yellow. "These lakes," says Mr. Flint, "are so ever covered with these large conical leaves, nearly of the size of a parasol, and a smaller class of aquatic plant, of the same kind of leaves, but with a yellow flower, that a bird might walk from stone to stone without dipping its feet in water; and the plants rise from all depths of water up to ten feet."—*Recreation*—p. 260.

GESSNER, whose countenance bespoke a paradise within, had his genius first called into action by reading the works of the now almost-forgotten BROCKES, who had selected for himself a species of poetry which exhibited the various beauties of Nature in the minutest details. Warm from the works of that poet, the scenery of Berg acquired new charms, and animated Gessner with new impulses, that town being situated in the most delightful part of the canton of Zurich. To the memory of this poet, his fellow-citizens have erected a monument, in which Nature and Poesy are represented weeping over his urn, in a romantic valley watered by the Limmat and the Sihl. This monument is the work of Trippel of Schaffhausen; and the artist dying while still young, his work may be said to form a "cenotaph scarcely less for himself than for Gessner." Gessner's writings, however, will perpetuate his name longer than a mausoleum of Parian marble. And here I may be permitted to pay a willing, though inadequate, tribute to the beauty of those lakes immortalized by the pens of Gessner, Haller, and Zimmermann; nor can I hesitate to call that man senseless who could behold with indifference the solitary, yet beautiful waters of Greiffen; those of Como, bordered by vineyards and backed by hills, like a stately amphitheatre, clothed with lime, chestnut, and almond trees; the craggy precipices rising over the Lake of Chiavenna, magnificent in the midst of sterility; and the waters of Joux, imbedded in a valley, with a rocky shore mantled with wood, and having on its opposite sides a richly-cultivated ascent, studded with pines and sycamores. Still more beautiful is the Lake of Wallenstadt, surrounded on three sides by mountains, with wild and picturesque, craggy and inaccessible rocks, abounding in waterfalls. Then we may gaze upon the small Lake of Zug, hanging, as it were, like a nest, within the bosom of a fine country, and upon that of Thun, at

right angles with the Lake of Brienz, both edged by steep mountains, strikingly variegated. Lake of Biemme, so exquisitely diversified, and of Neufchatel, profusely rich in wood, fields, meadows, and vineyards. The Lake of Uri—beautified by a proverb—with its wild and romantic rocks, embellished with forests of pine and beech. 'That of *Four Cantons* is the finest in all Switzerland for its greatness and variety of its parts, and for the magnificence and boldness of its contrasts. 'The Lake of Constance, of an oval form, and green in the centre, of its waters, is surrounded by hills, rising in succession, covered with farmhouses, villages, towns, and monasteries. Still more delightful is the Lake of Zurich, with banks, behind which rears in its majesty a stupendous chain of lofty mountains; while the waters of Geneva, blue and transparent, reflect every variety of landscape, from the most verdant and beautiful, to the picturesque, the magnificent, and the sublime.

On the banks of this lake resided the learned and accomplished Gibbon: learned and accomplished, but too regardless of his country, and too selfish for his own good or for the welfare of mankind. There—at Lausanne, beautifully situated on the banks of Geneva—he began and completed that great monument of his fame, his *History of the Decline and Fall of the Roman Empire*. There is a mixture of sublimity and pathos in the passage where he describes the close of his vast undertaking, peculiarly impressive. "I have presumed to mark the moment of conception (amid the ruins of Rome); I shall commemorate the hour of my final deliverance: it was on the day, or, rather, night of the 27th of September 1787, between the hours of eleven and twelve I wrote the last lines of the last page in a sun-dial house in my garden. After laying down my pen, I took several turns in a covered walk of acacia, which commands a prospect of the country

lake, and the mountains. The air was temperate, the sky was serene, the silver orb of the moon was reflected upon the waters, and all Nature was silent. I will not dissemble the first emotions of joy on the recovery of my freedom, and perhaps the establishment of my fame. But my pride was soon humbled, and a sober melancholy was spread over my mind by the idea that I had taken an everlasting leave of an old and agreeable companion; and that, whatsoever might be the future fate of my history, the life of the historian might be short and precarious!"

How high a fame have Haller and Hotze, so celebrated by Zimmermann and Lavater, acquired over Hunter and Boerhaave, merely from their imagination being alive to the beauties of their country! While the last two are known to few except surgeons and physicians, the first two are known to nearly the whole civilized world. Klopstock beheld the forests of pine intermingled with Elysian valleys, near Erfurt, the falls of the Rhine, near Schaffhausen, the Lake of Zurich, and the vineyards near Winterthur, with inexpressible delight; and those scenes alternately waked him to his friends and lifted his thoughts to Heaven. Bonnet, the pride of Geneva, devoted all his hours to the study of nature. As a philosopher, he is placed between Wolff and Leibnitz; as a naturalist, between Haller and Buffon; as a writer, between Rousseau and Montesquieu; while his countenance, says a German physiognomist, indicated justness, clearness, fertility, order: a combination of qualities scarcely equalled. His whole soul engrossed by the study of natural history, and in the enjoyment of some of the finest scenes upon the face of the globe, how mean and insignificant must have appeared to him the intrigues and passions of the citizens of Geneva!

WATERFALLS AND CATARACTS.

FROM lakes, the transition is natural that leads us to WATERFALLS and CATARACTS. With what rapture does one gaze upon that beautiful waterfall, gliding over a slate rock in two graceful jets, at the extremity of a long, winding, romantic glen, near Aber, in the county of Caernarvon! But if we would see cataracts on a grander scale, we must visit the falls of the Cynfael, and the Black Cataract, near the vale of Ffestiniog. Few scenes can surpass the beauty of the one, or the bold, cragged, and gigantic character of the other.

Few waterfalls more admirably combine sublimity with beauty than that of Nant Mill, on the borders of Lake Cwellin. It is difficult to conceive, indeed, of a scene more perfect: the far-famed cataract in the Vale of Tempe has nothing to compare with it. In surveying this scene, our feelings are like those of Bruce on beholding the third cataract of the Nile: "a sight," says he, "so magnificent, that ages added to the greatest length of life could never eradicate it from my memory."

The Romans were exceedingly partial to waterfalls, as we learn from many of their writers. The seat of Cicero's father had a remarkable one falling into the Liris, and sending forth a most agreeable harmony; and thither did Tully frequently retire, to meditate on subjects of literature and taste.

"What a sublime image of the creation," exclaimed Klopstock, on beholding for the first time the Falls of Schaffhausen, "does this cataract present! All powers of description are here baffled; and such an object can only be seen, and heard, and contemplated." "I have no words," he continues, "by which to paint my feelings; I can only think of the friends who are absent; I can form but the wish to draw them all into one circle, and to dwell with them here forever."

COMMUNITIES OF NATURE. 21

In King's Table-land, in New South Wales, is a cataract falling over a precipice of more than 1000 feet into Prince Regent's Glen. It is named "the Campbell Cataract," and is said to be one of the grandest sights in the world, being second only to Niagara. "I had, in the course of my life," says De Roos, "beheld some of the most celebrated sights of Nature: Ætna and Vesuvius; the Andes, almost at their greatest elevation; Cape Horn, rugged and bleak, buffeted by the southern tempest; and, though last, not least, the swell of the Pacific; but nothing I had ever seen or imagined could compare in grandeur with the Falls of Niagara."

MOUNTAINS.

A COUNTRY destitute of mountains may be rich, well cultivated, and even beautiful, but it can in no instance be sublime or transporting; and to what a degree boldness of scenery has the power of elevating the fancy, may be in some measure conceived from an anecdote recorded of a celebrated poet. When Thomson heard of Glover's intention to write an epic poem, the hero of which should be Leonidas of Sparta, "Impossible," he exclaimed; "Glover can never be idle enough to attempt an epic—he never saw a mountain in his life!" Burnet, in his *Theory of the Earth*, says that mountains inspire the mind with thoughts and feelings that naturally recall the greatness of God: it is a passage not unworthy the most distinguished of our descriptive poets.

Mount Olympus was called the "*Seat of the Gods*," because its top, being above the clouds, was always serene. The most picturesque parts of Armenia are those in the neighbourhood of the Ararat Mountain, on which the ark is said to have rested. This celebrated eminence, on the top of which

stand several ruins, rises in the for in the midst of a long, extended plain covered with snow from its girdle and for several months of the year opened by clouds. The modern Arabs treat this mountain holy, observing its with great care, and regulating their seasons and reaping by the melting of the snow.

What scenes in Russia are compared to the neighbourhood of the Oural and the Caucasus? which the inhabitants in their delirium believe to encompass the earth, as they imagine the sun to revolve round the land. Where does the Spaniard behold not more than at the feet and between the sides of the ridge that backs the Escorial, amidst the mountains of Asturias, or the vast solitudes of the Pyrenees. With what feelings of awe does the traveller approach the Carpathian ranges, stupendous and girted with beautiful glaciers. What joy and admiration does the Arab feel when he is long lost among deserts of sand, green and fertile as the Mountains of the Moon! Can the Italian painter select finer scenes than the glens of the Laurel, the Blue Ridge, the Berland Mountains? Or where, in any part of the Western World, can there be such conceptions of vastness and in the summits of the Andes? where "*Behold*" is written on every object.

Petrarch had long wished to climb Mount Venoux: a mountain presenting a range of prospect than any among the Alps. With much difficulty he at last arrived at its apex, the scene presented was of unequalled grandeur. After looking at the various objects which lay stretched before him, he took from his pocket a volume of Augustine's Confessions, and, opening

, the following passage first caught his eye :
 ravel far to climb high mountains ; to observe
 jesty of the ocean ; to trace the sources of
 but they neglect themselves." Instantly ap-
 his striking lesson to himself, Petrarch clo-
 book, and, falling into profound meditation,
 ough he, " I have undergone so much la-
 climbing this mountain, that my body might
 er to heaven, what ought I not to do that my
 y be received into its immortal regions ?"

ness attached to Mountains.—Mountains, no
 n rivers, have had a character of sacredness
 d to them. Upon their summits the Jews,
 sians, the Bithynians, the infidel nations
 Palestine, and the Druids of Gaul, Britain,
 rmany, were accustomed to sacrifice ; and
 ie Celts believed that the ghosts of their he-
 elt among the clefts of the rocks and upon
 intain tops, the natives of Greenland made
 ie immediate abodes of their deities. The
 ers also imagine that spirits, endowed with
 to influence human actions, inhabit their
 ins.*

e natives," near Mount Kessa, on the Niger, "believe
 nevolent genius makes that mountain his favourite
 d dispenses around him a benign and heavenly influ-
 ere the misfortunes of the unhappy are alleviated, the
 the needy supplied, and the lamentations of the mourn-
 to joy ; sin, sorrow, and suffering are unknown ; so
 ives place to merriment, and the solicitude of futurity
 enjoyment and thoughtless jocularly. But more es-
 say the natives, "the weary traveller here finds a
 un the storm, and a rest from his toils ; here he repo-
 delights of security, and revels in the comforts of ease.
 i this, however, it is necessary to make his wants and
 own to the *Spirit of the Mountain* by supplication and
 hen they are instantly answered ; he receives the most
 and excellent food from invisible hands ; and when
 ly invigorated by refreshment, he is at liberty either to
 his journey, or remain a while to participate in the
 of the mountain."—Lander's Journal of an Expedition
 , the Course of the Niger.

The Greeks entertained similar ideas, an opinion among them, sanctioned by poets and philosophers (of whom we have Homer, Plato, and Strabo), that the gods resided on the tops of mountains. Time after the deluge, not only for the security thus afforded against future inundations, but also on account of the sacred character of the mountains. Of these mountains three are famous for giving names to the Muses ; and Mount Olympus retains so much of its ancient sanctity. The Greeks of modern ages have erected a great number of churches, monasteries, and convents, which are frequented by numberless devotees. The mountain, which is 4350 feet high, is called Olympus ; and the monks employ themselves in planting and gardening, and in tilling their vineyards ; no woman being permitted to enter the monasteries or to live upon the mountain.

There was a temple erected by the Romans on the top of the Great St. Bernard by the order of Hannibal, which was dedicated to the Virgin Mary. The mountains under the name of Penine Mountains. In the temple the Carthaginian general offered sacrifices, and its ruins still remain. The Mounzing district in Ava is believed to reside on the top of the mountain, and the Acolhuas represented their monarch in the shape of a white man, sitting on a throne, and holding a vessel of seeds and elastic gum standing on the top of the mountain. When Christianity was introduced, the image was thrown down by order of the Spanish government of Mexico.

The Pico-Adam is held in great veneration by the Cingalese : Buddha is supposed to have lived there, and frequent pilgrimages are made to it. Savalan is considered holy by the mode of its being so high that snow lies perpetually upon it, and they believe it to be the tomb of the prophet, whose body is preserved entire in the snow.

chasms. What has been remarked of Mount Athos is equally applicable to Mount Tabor, near the city of Tiberias, a great number of churches and monasteries having been built upon it. This is the mountain on which St. Peter said to Christ, "It is good for us to be here; and let us make three tabernacles; one for thee, and one for Moses, and one for Elias." It was this mountain that the Vizier Fitzkili loved to cherish in his memory. Rising from the humble station of a shepherd on Mount Tabor, he kept in a retired room of his palace a scrip, a shepherd's coat, and the skin of a chamois, to remind him of his former pastoral life.

The American Indians, and the natives of the Gold Coast of Guinea, as well as those of Biledulgerid, interred their friends on high grounds, and their descendants retain the custom. The Jews buried their dead on the sides of mountains. Moses received the law on the top of Mount Sinai; and so holy was that mountain esteemed, that no one but himself was permitted to touch it. Josephus relates, that the Hebrew shepherds never pastured their flocks upon Sinai, believing that Jehovah dwelt there. Moses fed his flocks on Mount Horeb, and is said there to have received his inspiration. On that mountain the Deity appeared to him in a burning bush; there was the rock out of which issued water when he smote it; and there Elijah is said to have heard the still, small voice of the Almighty.

Its trembling cliffs of yore,
In fire and darkness deep pavilioned, bore
The Hebrew's God; while day, with awful brow,
Gleam'd pale on Israel's wandering tents below.

CAMOENS.

On Carmel dwelt a great number of ascetics, who being discovered there during the Crusades by a military pilgrim, their order was introduced by St. Lewis into Europe, under the appellation of Carmelite. This mount was the abode of Elijah and Eli-

sha : Pythagoras is also said to have meditated there ; and thither Vespasian travelled to consult the oracle. It is now covered with forests.

On Mount Gerizim the Samaritans erected a temple similar to that at Jerusalem, insisting that Gerizim was the spot which God had originally commanded to be erected. This act the Jews never forgave : they sued the Samaritans with the most relentless hatred ; they called them rebels and apostates ; and held them in such utter detestation, that to say " There goes a Samaritan " was equivalent to say " There goes a serpent." On this mountain the Samaritans adored the image of a dove ; and Scaliger, who wrote to their high-priest information relative to their faith, it appears they celebrated the Passover every year.

The Messiah frequently took his disciples to the top of a high mountain to pray ; there he was transfigured before them ; and many of the incidents recorded in Scripture occurred upon the Mount of Olives.

Height of Mountains.—The Himalayas.—In Hindustan, the line of perpetual snow is at an elevation of 4000 feet ; in Savoy and Switzerland, at 8000 feet ; on the Pyrenees, at 8100 ; on the Cordilleras, 15,747 feet ; and on the north side of the Himalaya range at 17,000 feet ; while no part of Teneriffe is covered with snow the whole year.

The Himalaya Mountains have been known in all ages. They formed part of the Caucasian chain and shared the general name of Imaüs, by which they were known to the Greeks. But it is only within a few years that their relative heights have been accurately ascertained ; and even now, many learned hesitate to believe that they equal, if not exceed, the boasted summits of the Andes. Their tops are covered with perpetual snows. Separating the southern from the northern nations of Asia, they are seen at the vast distance of 244 miles. The

first European who ever ascended them was Captain Webb, of the Bengal establishment. The elevation of several of them is stated to exceed 23,000 feet; and Colebroke even assigns to some of them the astonishing height of 24,740, 25,500, and 26,862 feet above the level of Calcutta.

In this stupendous range, fields of barley are seen at the height of 11,500 feet; and at 11,630 feet Captain Webb entered a forest rich in pines, oak, and rhododendra. It afforded a luxuriant vegetation, and strawberries were in full flower. At the height of 12,642 feet there was still no snow, but a profusion of dandelions, buttercups, and other flowers. Plants of spikenard were observed at 12,900 feet; and at 13,500 he reached the limit of vegetation.

Properties of Mountains.—It is curious to observe the effect of the air on mountains in respect to sound. On the top of *Ætna*, the report of a cannon appears less loud than that of a pistol below; Humboldt, when descending the Silla, heard distinctly, at a considerable distance, the shrill tones of the guitars playing in the city of Caraccas; and on the top of the Sugarloaf may be clearly distinguished the voices of the inhabitants in Cape Town.

Mountains have another singular property—that of attraction. By a series of observations made upon the Schehalieu, in Scotland, Dr. Masqueline (acting upon a hint thrown out by Newton, that a hemispherical mountain, three miles high, and six broad at the base, would cause a plummet to deviate two minutes from the perpendicular) found that mountain, with an elevation of 3000 feet, to draw the line from 5" to 6" out of the perpendicular.

Mountain Pride.—Highly interesting is it to observe what pride a mountaineer takes in his country. Coxe, travelling near Munster, was requested by a peasant to inform him what he thought of his country; and at the same time pointing to the mountains, he exclaimed, "Behold our walls and

bulwarks; even Constantinople is not so fortified." The Swiss are proud beyond measure of their mountains. "The Alps," says Bentivoglio in a letter to Monsignor di Modigliana, "are c for the Swiss, and the Swiss for the Alps." Welsh, too. I never reflect but with satisfaction at the answer of a farmer residing in one of the parishes near Ffestiniog, to my assertion that England was the finest and best country in the world: "Ah: you have no mountains, sir; you've got no mountains!"

On the summit of the Pichincha, Don Gaspar and Don Antonio de Ulloa planted themselves for the purpose of making astronomical observations. The Pichincha is not so elevated as the Cotacachi, but the view from it is more magnificent. After they had enjoyed the prospect for some time, the lightning began to issue from the clouds beneath their feet, and the loud pealing of the thunder ascended from below, while the sky above was of a deep azure. The spot where they stood was a vast accumulation of ice and snow; the cold was intense, and the mountain itself seemed, as it were, an island in the midst of a vast ocean; and the sublimity of the scene was heightened by the falling, at intervals, of enormous fragments of rocks into the valley beneath: the natives of these regions believe it to be superior to every country under heaven. In the same manner, the Sicilian peasants have such a veneration for *Ætna*, that they believe Sicily would be inhabitable without it: "It keeps us warm in winter," say they, "and furnishes us with ice in summer."

Xenophon's Return from Asia—March of Hannibal across the Alps—of Napoleon over the Great St. Bernard.—If towering eminences charm and elevate those who are pursuing the more quiet occupations of life, with what rapture do they inspire the heroes of men, long encompassed with danger, on beholding

from their summits the goal to which their wishes and exertions have been long anxiously directed! Xenophon affords a fine instance of the power of this union of association and admiration over the mind and heart. The ten thousand Greeks, after encountering innumerable difficulties and dangers in the heart of an enemy's country, at length halted at the foot of a lofty mountain. On arriving at its summit, the sea unexpectedly burst in all its grandeur on their astonished sight; the joy was universal; the soldiers could not refrain from tears; they embraced their generals and captains with the most extravagant delight; it seemed to them that they had already reached the places of their nativity; and in imagination they again sat beneath the vines that shaded their paternal dwellings.

On the other hand, the soldiers of Hannibal shrunk back with awe and dismay on coming to the foot of that vast chain, once believed to connect Italy with the pole. The sight of those enormous ramparts, whose heads, capped with eternal snow, seemed to touch the heavens, struck a sensible dejection into the hearts of the soldiers. Hannibal's force, at this time, consisted of 38,000 infantry, 8000 horse, seven-and-thirty elephants, and a long train of horses for carriage and burden. It was in the middle of autumn; the trees were yellow with the fading leaf; a vast quantity of snow had blocked up many of the passes; and the only objects reminding them of humanity were a few miserable cottages perched on the points of inaccessible cliffs, flocks perishing with cold, and men of hairy bodies and savage aspect. On the ninth day, after conquering unnumbered difficulties, the army reached the summit. The consternation among the troops now became so evident, that Hannibal thought proper to notice it. Halting, therefore, at a point of the mountains from whence there was a widely-extended view of Italy, he pointed out to them the luxuriant plains of Piedmont,

which lay like a large map before them. He magnified the beauty of those regions, and reminded them how near they were to putting a period to all their difficulties; assuring them that one or two battles would give them possession of the Roman capital. This speech, filled with such brilliant promises, and its effect heightened by the sight of Italian landscape, inspired the dejected soldiers with fresh vigour and alacrity; and, setting forward, they soon arrived in the plains below, not far from Turin:

“Then o’er the weeping vales destruction hurl’d,
And shook the rising empire of the world.”

On the 6th of May, in the year 1800, NAPOLEON, then First Consul of France, set off from Paris to assume the command of the French army of Italy. On the thirteenth he arrived in the neighbourhood of Lausanne. Having reviewed his troops, he pursued his march along the northern shore of the Lake of Geneva, and, passing through Vevey, Villeneuve, and Aigle, arrived at Martinach, situated near a fine sweep of the Rhone, not far from its confluence with the Durance. From this place the modern Hannibal passed through Burg and St. Brenchir; and, after great toil, difficulty, and danger, gained, with his whole army, the summit of the Great St. Bernard. The road up this mountain is one of the utmost difficulty, and the scenes which it presents are as magnificent as any in Switzerland. Rocks, gulfs, avalanches, or precipices, presented themselves at every step. Not a soldier but was alternately petrified with horror and captivated with delight; at one moment feeling himself a coward, at the next animated with the inspirations of a hero. Arrived at the apex of that tremendous mountain, and anticipating nothing but dangers and accidents in their descent, on coming to a sudden turning of the road they beheld tables covered, as it were by magic, with every kind of necessary refreshment.

The monks of St. Bernard had prepared the banquet. Bending with humility and grace, those holy fathers besought their military guests to partake of their humble fare. The army feasted, returned tumultuous thanks to their entertainers, and passed on. Shortly after this event, the battle of Marengo decided the fate of Italy, when Napoleon declared the Alps annihilated.

VALLEYS.

Ir abrupt and gigantic mountains, and, more than all, the ocean, elevate the mind, and exalt it above mortality, the woody dingle, the deep, romantic glen, the rocky valley, and the wide, rich, fascinating vale, associating ideas of rural comfort and of peaceful enjoyment, of cheerful industry, robust health, and tranquil happiness, draw us from subjects too high for human thought, chain us to terrestrial scenes, and enchant us with such magic spells "that earth seems heaven."

Vale of Tempe.—No country abounds more in those characters in which Nature delights to speak to the imagination than Greece. Her mountains were not more the theme of her poets than her vales, and no one of these was so celebrated as that of Tempe. A Greek writer calls it "a festival for the eyes;" and the gods were believed at times to wander in it.

In this enchanting valley were united the extremes of the beautiful and sublime: how beautiful, Elian has informed us; and how sublime, we may imagine from what is related by Livy; who assures us that when the Roman army was marching over one of the mountain passes leading to it, the soldiers were thrilled with horror at the awful appearance of the rocks, and the thundering noise of the cataracts.

Euripides also gives a noble description of this valley, and there is scarcely an ancient poet that does not allude to it in some way or other. Not least agreeable of its associations, however, is arising from its having been the spot where first discovered the art of curdling milk. Hence the fame of Aristæus and Cyrene.

Statius mentions a Tempe situated in Boeotia. Ovid another in Sicily. The Tempe of Switzerland is a valley lying in the bosom of the canton of Fribourg, near the mountains of Freyburg, watered by the Linth. That of Italy, says Cicero, is the district of the Reatines. The most beautiful spot in Africa is said to be about a day's journey from the mouth of the Reiskamma; the most sublime is that seen from the Mountain of Kaka; but Vaillant calls the canton of the twenty-four rivers the Tempe of Africa.

Humboldt is inclined to think the Valley of Tempe, among the solitudes of Mount Teneriffe, is the most beautiful the world affords; but the Valley of Cashmere would seem, by its associations, to have been even more beautiful than that. It was at the Tempe and the Elysium of the East; it was not only celebrated for its romantic scenery but for the learning of its Brahmins, its plane-trees and roses, and, above all, its beautiful women. In 1754 it fell under the domination of the Afghans, and in 1782, the governor oppressed it with every species of atrocity.

In the Vale of Tempe. Philip, king of Macedonia, was cited to appear before the Romans to answer for his conduct; and thither the Delphians sent a deputation, consisting of the finest youths in the city, every ninth year. On arriving in the valley they erected an altar, offered sacrifices, cut branches from the laurels which grew there, carried them home with a view of offering them at the temple of Apollo at Delphos. Julian, in a

Libanius, says the beauties of this vale were
 d only to the groves of Daphne, near Antioch ;
 rough its winding and solitary defiles Pompey
 ted, after the battle of Pharsalia : parched
 thirst, he threw himself upon his face and
 out of the stream. It is now a haunt for
 ti ; and what a haunt ! a valley, lying in the
 of mountains, shaded by the bay, the pome-
 te, and the wild olive ; the arbutus and the yel-
 ernessamine ; the wild vine ; the evergreen oak ;
 Oriental plane ; and the turpentine-tree, fre-
 ly festooned with different species of clematis.
Redale.—*Welsh Vales.*—The scene in England
 most resembles this celebrated vale is that
 Redale, in the county of Derby. In this dale
 frequently seen virgin's threads, flying in the
 ce fine untwisted silk, and which, falling upon
 s, are discovered to be a spider's web. This
 is a delicate plexus, formed in the body of the
 ; and which it is able to spin out of its bowels
 cretion. In certain states of the weather, the
 n spider frequently darts out a thread, which
 before the wind to a considerable distance, still
 g from the bowels of the spider, which soon
 mounts into the air, suspended by its own
 ds, and rises with those threads flying before
 us forming what are usually called " virgin's
 ds."

to teaches the swallow, the woodcock, and the
 ngale, to traverse the atmosphere from one
 te to another, at different seasons of the year ?
 directs the bee back to its hive, from a distance
 ny miles, when its eye can scarcely discern two
 s before it ? Who draws the salmon from the
 s of the ocean to ascend the rivers ? who the
 g and the pilchard from remote seas, to de-
 their spawn in climes congenial to their na-
 ? Who shapes the course of the winds ? and
 has pointed the magnet ? The same Power,

the same Intelligence which teaches the v
weave its silken net, and the spider to wait us
through the lower regions of air !

In England there are few vales remarkable f
picturesque effect. They are rich in wood, meadow
animals, and buildings, but they are destitute, f
the most part, of rocks, ruins, and mountains
None of them, therefore, can compare with th
vales of Clywd, Llangollen, or Ffestiniog ; and th
possess little to bring them in competition
those of the Usk, the Towy, or the Glamorg
Of these, the Clywd is the most rich ; Llang
the most picturesque ; Ffestiniog the most abow
ing in beautiful and sublime combination ; the Gl
morgan the most rural ; the Usk the most grac
but the Towy that which would be chosen for
quilt and elegant retirement.

WOODS AND FORESTS.

In the more rugged and imposing scenes of n
exalt the understanding and the fancy of those w
possess the powers and habits of reflection, Woods
those indispensable appendages to landscape, diff
an equal delight by their coolness, their solemn
and the charm which they spread around us as
wander beneath their arched and venerable shades

Pliny assures us that Minerva, as well as Dian
dwells amid the forests ; and Akenside finely a
to the religious feelings with which woods, a
stretching up the summit of a high mountain, is
the beholder :

“ Mark the sable woods,
That shade sublime yon mountain's nodding brow,
With what religious awe the solemn scene
Commands your steps ! as if the reverend form
Of Minos or of Numa should forsake
Th' Elysian seats, and down the imbowering glade
Move to your pausing eye.”

Nothing in the new continent is more striking than the exuberance of its vegetable productions. "When a traveller newly arrived from Europe," says M. Humboldt, "penetrates for the first time into the forests of South America, Nature presents herself to him under an unexpected aspect. He feels at every step that he is not on the confines, but in the centre of the torrid zone; not in one of the West India islands, but on a vast continent, where everything is gigantic—the mountains, the rivers, and the mass of vegetation. If he feel strongly the beauty of picturesque scenery, he can scarcely define the various emotions which crowd upon his mind; for he can scarcely distinguish what most excites his admiration, the deep silence of those solitudes, the beauty and contrast of forms, or that freshness and vigour of vegetable life which characterize the climate of the tropics." The region of forest, in this quarter of the world, occupies a space six times larger than all France.

The only resemblance that Europe ever presented to these primeval wilds was in that of the Hercynian forests, so often alluded to by Cæsar, Livy, and Marcellinus. But even this could have borne but a feeble similitude to those mighty solitudes, where the sun in the day, and the moon and stars at night, bound the vision; and which impress upon the mind of the traveller a gloom and melancholy not to be described.

The European settlers on the Copper Berg River, in South Africa, were accustomed to pass the whole summer, without house or hut, under the branches of the quiver trees. The Bedas of Ceylon live in woods, and their habitations are so concealed with foliage that it is difficult to discover them. The ancient Nasamones, in Cyrenaica, were accustomed to quit the seacoast in summer, leaving their cattle to wander about at large, and to betake themselves to the interior plains, to sit under the palm-trees and

gather their fruits. When a native of Java has a child born, he immediately plants a cocoanut, which, adding a circle every year to its growth, indicates the age of the tree, and by that means the age of the child. The child, in consequence, regards the tree with affection all the rest of his life.

It is curious to observe, that while the Hytopag of Ethiopia were so accustomed to trees that they are said to have had the power of jumping from one to another, there exists a people who never even saw a tree, a shrub, or a leaf. These people were discovered by Sir John Ross, between the latitude of 76° and 77° . When they first beheld his ships and their crews, they could scarcely be persuaded that they had not come from the sun or the moon; and when they went on board, nothing could equal their surprise at everything that presented itself to their view. They believed the ships to be animals. Trees they were utter strangers to, and were therefore entirely ignorant of their properties, that, seeing a mast lie across the deck, they attempted to lift it, and were greatly surprised to find themselves unable to do it, having no conception of its weight.

The great Khan of Tartary had a mount near Kambula, called the Green Mount; and Marco Polo relates, that whenever he heard of a fine tree growing anywhere, he caused it to be transplanted, however large it might be, to this mount. One of the succeeding khans (Kublai) directed a vast number of trees to be planted on each side of the great road, the Tartar diviners having assured him that whoever planted trees would enjoy life to an advanced age.

"There is nothing," it is said in the Life of Stamford Raffles, "more striking in the Malayan forests than the grandeur of the vegetation. Compared with our forest trees, the largest oak is but a dwarf. Here we have creepers and vines entwining large trees, and hanging suspended for more than

hundred feet, from trees rising from one hundred and sixty to two hundred feet high." "I ride," writes Davy, the celebrated chymist, "in the pine forest, near Ravenna, which is the most magnificent in Europe, and which I wish you could see. You know the trees by Claude Lorraine's landscapes. Imagine a circle of twenty miles of these great fan-shaped pines, green sunny lawns, and little knolls of under-wood, with large junipers of the Adriatic in front, and the Apennines still covered with snow behind. *The pine-wood partly covers the spot where the Roman fleet once rode.*"

Veneration for Trees.—If to rivers and fountains all nations, during the early periods of their history, have conspired to attach the idea of veneration, so have the eminent in all ages delighted in paying honours to groves and forests. Pilgrimages were made to the oaks of Mamre, near Hebron, from the time of Abraham to that of Constantine; and the nations surrounding the Jews were accustomed to dedicate trees and groves to their deities, and to sacrifice upon high mountains; the latter being practised even by the Jews themselves previous to the building of Solomon's Temple. Amid the woods of Etruria Numa sought refuge from the cares that attended the government of a new and, till his reign, turbulent people. I know not whether those objects tended to inspire him with a resolution of serving mankind; but certain it is that he infused into the minds of his adopted countrymen such an ardent love of virtue, that (as Livy informs us) the neighbouring states, which had hitherto regarded Rome in no other light than that of a camp, placed among them for the purpose of depopulating their cities, entertained so perfect a respect for its inhabitants, that they deemed it impious to disturb a people so exemplary in the practice of virtue and the worship of the gods. It was Numa who first erected a temple to Peace and Faith.

The consecration of groves was common among the Jews. Abraham himself planted a grove in Beer-sheba, and worshipped there. The custom was, however, forbidden by Moses. In Kings it is said, "they set up images on every hill, and under every green tree." Ezekiel reproves it; also Hosea; but the Valley of Hinnom was esteemed so venerable that it was even personified as a god; and in such esteem did they hold the cedars of Lebanon, that one of the most dreaded threats of Sennacherib was, that he would level them with the ground.

The oratories of the Jews were surrounded by olive-trees; and the Greeks who first inhabited Tuscany consecrated the forests which rose on the banks of the Cærites to their god Sylvanus. Under those shades they assembled every year to celebrate his anniversary; and a custom analogous to this still prevails in some parts of Italy, particularly among the herdsmen and shepherds of Rhegio.

The Christians dress their houses and churches with holly and bay; and the modern Jews, at the time of Pentecost, deck their synagogues with garlands of flowers. Tacitus, in describing the ceremony of consecrating the Capitol, after it had been repaired by Vespasian, informs us that the first part of the ceremony consisted in the soldiers entering with boughs of those trees which the gods were supposed to take the greatest delight in, and that then the Vestal virgins, attended by boys and girls, sprinkled the floor with spring-water, brook-water, and river-water.

Many of the Japanese temples are situated among woods. This people delight in avenues; and in the islands of Satsuma and Meac-Sima, the Russians observed alleys of high trees stretching from hill to hill, with arbours formed at certain distances for the service of weary travellers. The Raphaans of India selected spots shaded by the banana and the tamarind for their kioums; while in the deepest re-

cesses of the forest, the Druids of Gaul, Britain, and Germany were accustomed to sacrifice. Virgil, who describes Elysium as abounding in the most luxuriant gifts of nature, represents it as one of the highest enjoyments of the happy spirits to repose on flowery banks and to wander among shady groves ; and the Icelanders believe that on the summit of the Boula, a mountain which no one has hitherto ascended, there is a cavern which opens to a paradise in perpetual verdure, delightfully shaded by trees, and abounding in large flocks of sheep.

The Syrians personified their god Rimmon under the figure of a pomegranate ; and the Babylonians had one carved on the heads of their walking-sticks, esteeming it a sacred emblem. In the Romish Church, palms are still esteemed sacred ; while in some parts of Calabria, they regard the cutting off a single branch from an olive-tree a deed worthy of excommunication. That the Anglo-Saxons worshipped trees, we may infer from Canute's having forbidden that species of idolatry.

The temples of the Greeks were mostly situated in groves ; and the Persians, who esteemed woods and forests the most proper for religious sacrifices, ridiculed their more accomplished neighbours for building temples to the gods, who had the whole universe for their residence. The Athenians, much after the same manner of reasoning, would never build a temple to Clemency, believing her most appropriate temples were the hearts of men.

The early Christians, also, being reproached for erecting no temples, Arnobius indignantly asked if it were not an insult to the Deity to suppose that he could not be worshipped without confining him to an habitation ?

“Thou, O Spirit, who dost prefer,
Before all temples, the upright heart and pure.”

Genghis Khan could not conceive the propriety of

erecting temples, nor could he imagine why God might not be everywhere adored. The same may be said of the ancient Spaniards, Scythians, and Numidians.

The Germans are said to have esteemed sacred even the leaves of the Hyrcinian forest. The natives of New Spain were accustomed to assemble under a tree, sixteen fathoms in circumference, to perform religious sacrifices ; and Smith assures us that the Whidah negroes, inhabiting a country beautiful even to poetry, have a grove in almost every village, to which they retire on certain days to make offerings.

Esculent Products of Trees—Cocoanut-tree—Bread-fruit—Palo de Vaca, &c.—The COCOANUT-TREE is not only so productive of food, but so useful in other respects, that an elegant writer, in recommending a mild and equitable government to be pursued in India, not solely for the sake of humanity, but also of policy, insists that this tree should be the emblem of the British empire in the East. When old, it yields a species of oil that is used for light ; of its juice is made a grateful beverage ; the cabbage which grows upon it answers many culinary, and its leaves many mechanical purposes. Its trunk is used for building, its fibres for cordage, and its shell for domestic utensils. So valuable, indeed, is it, in a national sense, that one of the kings of the Maldiv Islands sent an ambassador to Ceylon, when possessed by the Dutch, in a ship not only built, but entirely rigged from the products of this tree. It is also so conspicuous as a landmark, and so little affected by the sea-air or spray, that Captain Flinders was accustomed to say, that any navigator who should distribute ten thousand cocoanuts upon the numerous sandbanks of the Indian and Pacific Oceans, would be entitled to the gratitude of all maritime nations.

The uses and virtues of the plantain, the oil-palm,

and the date-tree,* too, are well known : those of the **BREAD-FRUIT-TREE** are still more important ; and yet it grows in Ceylon, and is little thought of. In Guam it attains a size larger than our apple-trees : when ripe, it is soft and yellow, and its taste sweet ; when full-grown, the Guamans bake it, it having neither seed nor stone, but is a pure substance, like bread, and continues in season eight months of the year. Thus the cocoanut-tree, the oil-palm, and the bread-

* When I looked on the desert, and plains which lie between Abusheher and the mountains, and saw the ignorant, half-naked, swarthy men and women broiling under a burning sun, with hardly any food but dates, my bosom swelled with pity for their condition, and I felt the dignity of the human species degraded by their contented looks. "Surely," said I to an Armenian, "these people cannot be so foolish as to be happy in this miserable and uninstructed state. They appear a lively, intelligent race ; can they be insensible to their comparatively wretched condition ? Do they not hear of other countries ? Have they no envy, no desire for improvement ?" The good old Armenian smiled and said, "No ; they are a very happy race of people, and, so far from envying the condition of others, they pity them. But," added he, seeing my surprise, "I will give you an anecdote which will explain the ground of this feeling. Some time since, an Arab woman, an inhabitant of Abusheher, went to England with the children of Mr. B. She remained in your country four years. When she returned, all gathered round her to gratify their curiosity about England. 'What did you find there ? Is it a fine country ? Are the people rich—are they happy ?' She answered, 'The country was like a garden ; the people were rich, had fine clothes, fine houses, fine horses, fine carriages, and were said to be very wise and happy !' Her audience were filled with envy of the English, and a gloom spread over them, which showed discontent at their own condition. They were departing with this sentiment, when the woman happened to say, 'England certainly wants one thing.' 'What is that ?' said the Arabs, eagerly. 'There is not a single date-tree in the whole country !' 'Are you sure ?' was the general exclamation. 'Positive,' said the old nurse ; 'I looked for nothing else all the time I was there, but I looked in vain !' This information produced an instantaneous change of feeling among the Arabs ; it was pity, not envy, that now filled their breasts ; and they went away, wondering how men could live in a country where there were no date-trees !" — *Sketches of Persia.*

fruit-tree furnish, in the countries where they the staff, as it is called, of life. In some parts of Norway, where vegetation is confined principally to moss and lichens, it has been discovered that those vegetables may, with little trouble, be converted into a bread more palatable and nourishing than the bread of bark, to which the inhabitants have been so long accustomed.

But the greatest of all vegetable phenomena, though not so useful to mankind as the bread of life, appears to be the *PALO DE VACA*. This plant produces a glutinous liquid like an animal substance. It frequently grows upon the barren sides of mountains and has hard, coriaceous leaves. For several months in the year its foliage is not moistened by a shower of rain, and its branches appear entirely dried up; but upon piercing the trunk, particularly at the rising of the sun, there flows a sweet and refreshing yellow juice, having a balsamic perfume, and possessing many of the qualities of milk. In the morning, the natives of the countries where this vegetable fountain grows visit it with bows and arrows, which they carry home the liquid which exudes from it for their children. "So that this tree," says the Baron de Humboldt, "seems to present the figure of a shepherd distributing the milk of his flock." The Araguans call it the cow, the Caucaquians the milk tree.* Humboldt, Kunth, and Bredemeyer have seen the fruit of this tree, but no naturalist, I believe, has yet seen the flower. Laet, who wrote early in the seventeenth century, mentions a similar tree

* "This vegetable milk possesses all the physical properties of the milk of animals, only it is a little thicker, and mixes less readily with water; it also becomes yellow, and thickens on the surface like cream. When boiled, it does not coagulate, but a yellow pellicle is formed on the surface. Acids do not coagulate with this milk any coagulum, as with that of the cow.

"Recently a substance has been extracted from the juice of the *carcêa papaya*, which appears to be similar to that from the milk of the cow-tree."—Anon.

SUBLIMITIES OF NATURE.

growing in the province of Cumana. It grows throughout the country from Barbata to Lake Maracabo.

In the interior of Africa is a tree (*Shea*) which produces excellent butter. It resembles an American oak, and its fruit is not unlike the Spanish olive. It grows abundantly in Ashantee, and in the woods near Kabba. This vegetable butter, which is obtained from the kernel, is whiter, more firm, and, in Mark's opinion, far better than that produced from olives. It has also the advantage of keeping all the year without salt, even in that intensely hot country. The cream-fruit of Sierra Leone affords a similar saccharine fluid.

In some regions of America, Africa, and Asia, a fluid exudes from the palm, which by an easy process is converted into wine. Between Table Bay and False Bay, near the Cape of Good Hope, there grows, amid white sand, a shrub, the berries of which make excellent candles. This plant is also well known in the Azores and America, where it is called the candle-berry-myrtle. Vegetable tallow grows in Siac and Sumatra; while the bark of the quillai-tree of Chili has many of the properties of soap. In Chili there is likewise a shrub, called *thurania*, which produces incense equal to that of Arabia. This gum exudes in the form of globules of tears through pores in the bark: these globules are white and transparent, having a bitter taste, but an aromatic perfume.

In that fine country grows, too, a species of wild oil, sixty miles from the sea, which, in a soil having no appearance of salt, is covered in the morning, from spring to winter, with saline particles, which the inhabitants use as salt.

Poetical Illustrations. — I could never wonder, though I have heard others do so, that poets should have feigned the oak to have been originally a patriarch and a sage. Ovid and Lucan give fine descriptions of the oak, and the honours which were paid to

There is, indeed, scarcely a descriptive or an epic

poet that does not find some occasion to sing its praises : and Loton, the landscape painter, so much delighted in it, that he contrived to introduce one into all his pictures.

The use which the poets have made of trees, by way of illustration, is moral and important. Homer frequently embellishes his subjects with references to them ; and no passage in the *Iliad* is more beautiful than the one where, in imitation of Musæus, he compares the falling of leaves and shrubs to the fall and renovation of ancient families. Illustrations of this sort are frequent, too, in the sacred writings. "I am exalted like a cedar in Libanus," says the author of *Ecclesiastes*, "and as a cypress-tree upon the mountain of Hermon. I was exalted like a palm-tree in Engeddi, and as a rose-plant in Jericho ; as a turpentine-tree I stretched out my branches, and my branches are the branches of honour and grace. As a vine brought I forth pleasant savour, and my flowers are the fruits of honour and victory." In the *Psalms*, in a fine vein of allegory, the vine is made to represent the people of Israel : "Thou hast brought a vine out of Egypt ; thou hast cut out the heathen, and planted it. Thou didst cause it to take deep root, and it filled the land. The hills were covered with its shadow, and the boughs thereof were like the goodly cedars."

In Ossian, how beautiful is the following passage of Malvina's lamentation for Oscar : "I was a lovely tree in thy presence, Oscar, with all my branches round me ; but thy death came, like a blast from the desert, and laid my green head low : the spring returned with its showers, but no green leaf of mine arose." Again, where, old and weary, blind, and almost destitute of friends, he compares himself to a tree that is dried up and decayed : "But Ossian is a tree that is withered ; its branches are blasted and bare ; no green leaf covers its boughs ; from its trunk no young shoot is seen to spring : the breeze

whistles in its gray moss ; the blast shakes its head of age ; the storm will soon overturn it, and strew all its dry branches with thee, oh Dermid ! and with all the rest of the mighty dead, in the green winding vale of Cona."

Petrarch could never behold an olive-tree but his imagination presented to him that simile in Homer, where he compares Euphorbus, struck by the lance of Patroclus, to an olive uprooted by a whirlwind : a simile so harmonious in all its parts, that even Pythagoras set it to music, played it upon his harp, and adopted it for his epicedium.

Vegetable Analogies and Similitudes.—Analogies are continually presented to us between trees and sentiments. Phocion, hearing an orator one day promising a number of fine things to the Athenians, exclaimed, "I think I now see a cypress-tree : in its leaves, its branches, and in its height it is beautiful ; but, alas ! it bears no fruit." In Milton, Eve declares to Adam that his conversation was more sweet to her ear than was the fruit of the palm-tree to her palate ; and Quintilian likens Ennius to a grove, which, sacred from its antiquity, fills the mind with religious awe. "Plotinus," says Gassendi, "compared the souls of men, emanating from and partaking of the Divine mind, to the leaves, flowers, and fruits belonging to the body of a tree." Beautiful, too, is the metaphor, and delicate the flattery, where Horace represents the glory of Cæsar's house as resembling a tree rising slowly from its seed, and, after several ages, spreading its branches to the heavens ; then towering with as much dignity in the forest as did Marcellus above all other youths. Blair compares a good man to an oak, whose branches the tempest may indeed bend, but whose root it can never touch : a tree which may occasionally be stripped of its leaves and blossoms, but which still maintains its place, and in due season flourishes anew.

These analogies and similitudes are not unobserved by savage nations : of this the story of the Scythian ambassadors to Alexander is kingly illustrative. " If your person were as great as your desires," said they, " the world would contain you. Your right hand would touch the east and your left the west. You grasp at more than you are equal to. From Europe you reached Asia ; from Asia you laid hold on Europe ; and, if you conquer all mankind, you seem disposed to wage war with woods and snows, with rivers and wild beasts, and to attempt to subdue Nature. But have you considered the natural course of things ? Have you reflected that great trees are many years in ar-
 at their height, and yet are cut down in an instant. It is foolish to think of the fruit only, without considering the height you have to climb to come to it. Take care lest, while you strive to reach the top, you fall to the ground with the branches you laid hold of."* The whole of this speech, though spoken by a *barbarian*, is superior to any other served by Thucydides, Xenophon, Polybius, or Sallust, Tacitus, Davila, or Guicciardini.

The argument as to the relative excellence of ancient and modern genius, acquires new light from the ingenuity of Fontenelle and the rejoinder of Du Bos. " The question," said Fontenelle, " is reducible to this point, viz., whether trees do or do not grow in our times as luxuriantly as in the times of the Greeks and Romans. The surest way to determine this point is to consult natural philosophy. She has the secret of abridging many disputes, and rhetoric would protract to eternity." " With a good heart," rejoined Du Bos ; " I freely give my consent. What answer does she give us ? She tells us

* Montesquieu has an admirable illustration of the same. " When the savages of Louisiana," says he, " wish for more land, they cut down the tree at the root to gather its fruit. Behold : the fruit is the luxury of the present, the root is the nature of despotic government."

things essential to our argument. The first is, that some plants have, in all times, attained greater perfection in one country than another: the second, that even in the same country trees and plants do not produce every year fruits of equal goodness."

Some writer has compared the human heart to certain medicinal trees, which yield not their healing balm till they have been wounded: a simile and sentiment forcibly reminding us of the "Non ignara mali" of the gentle but unfortunate Dido. Montesquieu, anticipating the difficulty of searching into the origin of the feudal laws of the Franks, has an illustration, also, finely suited to our subject. "The feudal laws," says he, "present a very beautiful prospect. A venerable oak raises its head to the skies; the eye sees from afar its spreading branches; upon drawing nearer, it perceives the trunk, but does not discover the root; the ground must be dug to discover that."

Similar illustrations are to be met with among Asiatic writers. Ferdousee thus concludes his satire upon Sultan Mahmoud: "That tree, the nature of which is bitter, were you to plant it in the Garden of Eden, and water it with the ambrosial stream of Paradise, and were you to manure its roots with virgin honey, would, after all, discover its innate disposition, and only yield the acrid fruit that it had ever yielded."

That trees have something analogous to sensation, it were indicative of ignorance in Nature's economy to doubt. Hence the poets and mythologists have supposed them to be the residence of inferior deities; and beautiful are the fictions which have arisen out of this belief. Not to mention any from the ancient writers, Ariosto describes those who suffered themselves to listen to the fascinations of Alcina as being changed into beeches, palms, olives, and cedars; and far superior to the fictions of Ovid is that of Tasso, where he describes Rinaldo arri-

an enchanted wood, where he sees a large
surrounded by a hundred smaller ones. As
approaches, the air resounds with bewitching mu-
sic every tree opens, and discloses nymphs of se-
raphic beauty ; who, forming into a circle, welcome
him to the enchanted grove with songs of pleasure
and delight.

DESERTS.

AN attentive observer discovers, for the most part,
but little monotony in Nature. The meridian day
succeeds to morning, evening to noon, and night to
evening ; summer to spring, and winter to autumn.
The sea itself frequently changes its appearance in
the course of the day. When the sun shines bright-
ly, its colour is cerulean ; when it gleams through a
mist, it is yellow ; and as the clouds pass over, it
not unfrequently assumes their tintings. The same
diversity may be observed throughout nature ; even
the glaciers of the Grisons presenting varied aspects,
though clad in perpetual snow. At dawn of day
they appear saffron ; at noon their whiteness is that
of excess ; and as the sun sinks in the west, they
become as yellow as burnished gold ; while their
convex and peaked summits reflect, with softened
lustre, the matchless hues of an evening sky. Hence
Virgil applies the epithet *purpureum* to the sea, and
not unfrequently to mountains, while Statius col-
ours the earth with the splendour of Aurora. The
same is beautifully alluded to by Mallet. The sun,

“Glorious from amid

A pomp of golden clouds, th’ Atlantic flood
Beheld oblique ; and o’er its azure breast
Waved one unbounded blush.”

These successive alternations impart a perpetual
variety to the same objects Hence the frequent

changes exhibited in mountainous regions give them a decided advantage over a champaign country, since the degrees of light and shade, as the hills and valleys alternate with each other, are blended, reflected, and contrasted in a thousand different ways. These ever-varying aspects are most strikingly presented in Italy, in Sicily, among the Carpathian Mountains, and, more especially, among the valleys and lakes of Switzerland. At Spitzbergen the scenery is composed of bleak rocks and mountains; glaciers fill the valleys, and the whole is romantically contrasted with the whiteness of the snow and the green colour of the ice: the voyager is never weary of gazing. A total want of contrast, on the other hand, fatigues the traveller over the Steppes of Asia, the Pampas of Buenos Ayres and Chaco, the Prairies of North America, the Llanos of Varinas and Caraccas, and the Deserts of Africa, almost as much as the actual distances themselves.

The ancients, ignorant of the magnetic powers of the needle, were able to travel over extensive deserts only by night: when the sun appeared, they were obliged to halt. Quintus Curtius, in describing the Deserts of Bactria, says that a great part of them were covered with barren sands, parched by heat, affording nourishment neither for men, beasts, nor vegetables. When the wind blew from the Pontic Sea, it swept before it immense quantities of sand, which, heaped together, appeared like mountains. All tracks of former travellers were thus totally obliterated, and the only resource left was to travel during the night, by the direction of the stars.

Deserts, from their expansion, sterility, privations, and unbroken silence, are terrific and sublime to the last degree. The deserts of America are said to have a character producing a melancholy which no language can adequately express; and those of

Asia and Africa afflict the mind with still more painful emotions. A stillness like that of the grave pervades the whole scene, from the one extremity of the horizon to the other. A sea of sand stretches on every side, and not a tree, nor so much as a blade of grass, relieves the eye.

With deserts we associate the camel and the ostrich: the former exhibiting a highly curious and striking instance of the adaptation of animals to the wants and service of the human race; the latter leading, with her mate, a secure, innocent, and social life, and, so far from leaving her eggs or her young, as many have supposed, to the mercy of the elements, paying them an earnest and strict, though, from the nature of the climate in which she lives, divided attention, her mate and herself alternately watching them.

Many deserts, like the vale in Persia called the Valley of the Angel of Death, are lands that "no man passes through, and where no man dwells." Wastes of glowing sand, they bear for their character a deep and majestic stillness: with no habitation, no motion, not a trace of animal or vegetable existence; and on their surface Nature herself seems dead.

In the great desert of Sahara, so vast and utterly desolate is it, that Adams travelled with the Moors nine-and-twenty days without seeing a single plant—not even a blade of grass! and Sidi Hamet reported to Riley, that he journeyed over the same desert twenty-eight days in another direction, with the same uninterrupted aspect of sterility: during ten days of this journey the ground was as hard as the floor of a house. He was on his way to Timbuctoo, in a caravan consisting of eight hundred men and three thousand camels. In a subsequent journey, with a thousand men and four thousand camels, they encountered the burning blast of the desert. For two days they lay prostrate with their faces to the

ground: two hundred camels, and upward of three hundred men, perished. This desert, which is the largest in the world, is equal in extent to the one half of Europe.

Napoleon, in crossing the desert to inspect the forts of Suez, and to reconnoitre the shores of the Red Sea, passed only one tree in all the journey; the whole of which was marked with the bones and bodies of men and animals. The night was cold, and there was no fuel. His attendants gathered the dry bones and bodies of the dead, that lay bleaching on the sand: of these they made a fire, and the conqueror of Egypt laid himself down upon his cloak, and slept in the warmth.*

The sands of the deserts were probably once the sands of the sea. While surveying Nature under these aspects, where all is inanimation and mystery, in the midst of a profound, frightful silence, the mind sinks beneath the weight of an oppression it is unable to bear. No plant, no quadruped, no bird, no insect gives relief to the unvaried prospect: a boundless view, like that of the ocean, but destitute of winds, of the music of waters, the *teinture* of clouds, and the motion which gives life and circulation to the most torpid of climates. All is one vast scene of deathlike monotony. In the night, however, the heavens display a moving picture of magnificence not to be paralleled elsewhere, as if the God of Nature had directed all his powers to frame an exhibition, at once to command the admiration and overwhelm the faculties of the soul.

If deserts present such terrible images to the

* "The emperor remarked that the desert had always a peculiar influence on his feelings. He had never crossed it without being subject to a certain emotion. It seemed to him, he said, 'the image of immensity: it showed no boundaries, and had neither beginning nor end: it was an ocean on *terra firma*.' His imagination was delighted at the sight; and he took pleasure in drawing our attention to the observation that 'Napoleon' meant 'Lion of the Desert.'"—*Las Casas*.

mind, there are circumstances connected with the history no less appalling. The records of the war present to us nothing more disastrous than the expedition of Cambyzes, if we except, perhaps, the destruction of Sennacherib's army before the walls of Jerusalem, and the annihilation of the army of Napoleon amid the snows of Russia. Having

Defiled each hallow'd fane and sacred wood,
And, drunk with fury, swell'd the Nile with blood,

Cambyzes divided his forces into two parts. One of these he headed himself against the Ethiopians but was obliged to return to Thebes for want of supplies, after having lost a vast number of his soldiers, who were driven even to the necessity of eating human flesh. The division which he sent against the Ammonians was never heard of after, and is supposed to have been overwhelmed in a whirlwind which buried it in the sands.

But, horrible as this event was, the Spanish and Portuguese writers present us with a narrative of an individual suffering still more deeply affecting. Every father, mother, and child can sympathize with Don Emanuel de Souza and his unhappy family in the terrible misfortunes which befell them. Having amassed a large fortune at Diu, of which he was governor, Don Emanuel embarked with his wealth, his beautiful wife, and his children for his native country. The ship in which they sailed was wrecked upon the coast of Africa. Escaping with his wife and children and a part of the crew, he pursued his way by land. The country became more barren and more desolate as they advanced. In vain they searched for water or food, and most of them died of hunger, thirst, or fatigue. Some were murdered by the natives, and not a few were devoured by wild beasts. Donna Leonora arrived at last, with her husband and children, at a small Ethiopian village. Emanuel having sunk from heat, exhaustion,

ness of mind into a state of insanity. Here we were obliged to give up their arms, and this a signal for outrage. The savages stripped them naked, and, in the midst of a pathless desert, under a burning sun, left them to the mercy of wild beasts. The wretched travellers continued their journey. The feet of Leonora swelled, and at length bled at every step. Her children, dying with hunger and thirst, cried out in all the agonies of death. Shocked at her exposure, she knelt to the ground, dug a hole with her hands in the sand, and pressed herself up to the bosom in it. There she received the last breath of two of her children. She gave herself up to despair; her lips were burnt with thirst; her eyes sunk in their sockets; she stretched out her arms to her husband, and died in his embrace. Frantic with his calamities, Don Juan caught his only remaining child in his arms, and rushed into a neighbouring wood, where they were almost instantly devoured by lions, their groans being heard by the few remaining remnants of his party, who, after numberless dangers, returned to Portugal to relate the melancholy

habitants of Deserts.—The inhabitants of deserts, for the most part, been separated alike from pleasures and the habits of civilized life. The Carthaginians and Gætulians knew little or nothing of husbandry; they roved about after the manner of Scythians, sleeping on their garments, and using pointed arrows to protect themselves against the beasts that prowled around them on every side. The deserts of Zara were once peopled by a nation possessing all things in common. They are mentioned by Lucan, Pliny, and Silius Italicus. The representation to us of the ancient inhabitants of this country beyond the Numidian deserts exhibits a striking contrast with those of the intervening times; Leo Africanus informing us that they lived

in a state of partial equality, hunting wild animals, tending their flocks and herds, and preserving the honey of bees, the natural fertility of their soil enabling them to live without toil, ambition, or violent passion. They never went to war, and never travelled out of their own country.

The inhabitants of the Arabian deserts are descendants of Ishmael, the son of Abraham and Hagar, of whom Moses relates that God declared before his birth that "he should be a wild man, his hand should be against every man, and every man's hand should be against him." He became an archer, and dwelt in the wilderness where his descendants remain even to this day, living in clans or tribes. As Ishmael was an archer, so were his descendants in the age of Isaiah up to the time when firearms were introduced; they were the most skilful archers in the world. Age to age have these Ishmaelites been in perpetual hostility with the surrounding nations, and yet they occupy the same wilderness still. They retain the same character, manners, and customs. Savage disposition, they are social only to those of their tribe. They wander from spring to spring, subsisting chiefly on their herds and the milk of their camels, and living in tents covered with skins. Like the Jews, they refer to twelve original tribes; practise circumcision, marry only among themselves, and retain with equal pertinacity their peculiar habits and prejudices. In one remarkable circumstance, however, they differ: the Jews still adhere to the dispensations of Moses; the Ishmaelites embraced the faith of Mohammed; and while all the countries which surround them have been subject to storms and revolutions beyond those of any other quarter of the globe, and while the Jews are scattered through all the nations of the earth, they have remained the same under every vicissitude. The Scythians, the Persians, Alexander, Pompey, G

Trajan, and Severus raised large armies with a view of extirpating them, they were never able to do them any serious injury. They rode without saddles or bridles, and in the hottest of the engagement managed their horses with their whips alone, charging their enemies generally in the night. They were a healthy, long-lived people; they clad themselves in loose garments, had a plurality of wives, and seldom indulged in meat, living chiefly on herbs, roots, milk, cheese, and honey.

If the Numidians were superior to the Nigratiæ, Gætulians, and Mauritanians, the inhabitants of the deserts of Petra seem as much to have surpassed the Numidians. When Demetrius, by order of his father Antigonus, sat down before Petra with an army, and began an attack upon it, an Arab accosted him after the following manner: "King Demetrius, what is it you would have? What madness can have induced you to invade a people, inhabiting a wilderness where neither corn, nor wine, nor any other thing you can subsist upon is to be found? We dwell in these desolate plains for the sake of liberty, and submit to such inconveniences as no other people can bear in order to enjoy it. You can never force us to change our sentiments or our way of life; therefore we desire you to retire out of our country, since we have never injured you; to accept some presents from us, and to prevail with your father to rank us among his friends." Upon hearing this, Demetrius accepted their gifts and raised the siege.

STORMS AND TEMPESTS.

HIGH winds, tornadoes, and thunder-storms are peculiarly impressive to men of lofty imaginations. In the Greek mythology Jupiter was represented as

the deity of clouds, lightning, thunder, and te
Many are the passages in the poets in wh
phenomena are described in adequate tern
iritation. What a fine effect is produce
Iliad, where the thunder strikes awe into t
of Nestor and Diomed, and completely unn
companions! And where the chiefs are
startled in the midst of their carousals :

Humbled they stood: pale horror seized them
While the deep thunder shook the aerial hall.

In the Hebrew writings, also, the Deity is
ly represented as employing tempests ag
enemies of his chosen people. Tasso has
lected to imitate these fine examples. M
improved upon them, and Ossian has all
passed both Tasso and Milton.

The storms of Europe, sublime as they
not compare with those of Africa, Asia, a
ica. The mountains of Kondokoo, near t
bia, are cultivated to the summits; vill
erected in romantic glens between them
inhabitants listen, with solemn yet not un
awe, from their tremendous precipices, as
der rolls in lengthening volumes from one
defile to another.

Thunder is often heard among the Andes,
ning is said to be entirely unknown in
Egypt, and Chili. In the south of Italy it
both in summer and winter. At the Cape
Hope lightning is rarely seen, and thunder s
rarely heard. In the deserts to the north, l
both the one and the other assume the mo

* Lui-shin, the Chinese god of thunder, has the w
and talons of an eagle. The Gauls and Scythians v
thunder, under the name of Taranis; and the Druids
pretended to be able to transform themselves and c
animals, to cure diseases, and to foretel events, affe
to have the power of raising and quelling storms.
landers once adored thunder, under the name of Hori

ful character, there being nothing to conduct the electric fluid to the earth. At these times the Boshmen relieve their fears by uttering the bitterest imprecations. In Sumatra thunder and lightning are so frequent that they attract no attention except during the northwest monsoon, when the lightning forks in all directions, the sky appears like an ocean of fire, and the ground trembles as in an earthquake.

The West Indies are subject to hurricanes, and the East Indies to typhons. Than a typhon few things are more sublime in the whole range of Nature's phenomena. That at the setting in of the southwest monsoon, in the middle of June, is preceded by furious blasts of wind, followed by lightning in the distant horizon, and which soon approaches nearer, appearing and disappearing every instant. The loud pealing of the thunder is next heard, until at length it bursts in tremendous crashes. As soon as the thunder ceases, rain begins to descend, and continues for many days. The sky after this clears, and Nature, which had before been fainting with drought, assumes everywhere a renovated aspect. The rivers are full and tranquil, the air is pure and delicious, and the sky varied and embellished with fleecy clouds. Gentle rains then ensue; in July they become more violent; in September they gradually abate, and, towards its close, depart as they came, amid thunder, and lightning, and tempests of wind.

One of the most dreadful typhons on record is that witnessed and recorded by Forbes. The British combined force lay encamped at Baroche, and were preparing to resume their march after the enemy the next morning. But in the night the heat became oppressive, the sky darkened, stillness pervaded the air, and in a few moments the clouds burst, and a deluge poured upon the plain such as is scarcely conceivable. The tents soon gave way, the water suddenly rose, and 200,000 horses, oxen, camels, and elephants, with 100,000 human beings,

were exposed to the full fury of the tempest in this strange country, and in the midst of darkness rendered more awful and sublime by vivid lightning. It was discovered in the morning that a great number of persons had perished. The ground was covered with the carcasses of oxen and horses, some half buried in the mud, others already in a state of putrefaction. The dead were seen expiring with wet and exhausted men contending for life, and parents beside the dead bodies of their children.

A flash of lightning once discovered an immense treasure. Near the city of Paz, in Peru, on a mountain which the natives call Telemani, the lightning discharging itself, severed a peak at its summit, and this, falling on the side of a mountain, was found to contain such a quantity of gold in fragments that this metal, says Ulloa, sold at some time even as low as eight pieces of eight for an ounce. This incident would seem to have added an inexhaustible wealth to the proprietors of the mine; but the part whence the crag was so entirely covered with snow and ice during the whole year, that the owners have never been able to realize any other benefit than that obtained in the first instance.

Gomorrah was destroyed by lightning, Job's flocks and shepherds, and the whole Sennacherib. The temple of Apollo, at Delphi, was destroyed by the electric fluid; also the temple of Volscinium, in Italy; and Romulus and Æneas met a similar fate, the latter while trying experiments on the nature of that fluid.*

In some parts of Greece, places struck by lightning were esteemed sacred. In others, places struck by it were instantly buried, as heathen objects. In some, again, they were not buried.

* This very remarkable circumstance has been lit

but left to decay on the spot. In Rome they were held sacred; but Numa enacted that all persons killed by lightning should be interred immediately, without any funeral ceremony. During a thunder-storm the Persians go to prayers, while the Indians of New-Holland rush out of their huts and deprecate its vengeance. The Gentoos believe that thunder and lightning proceed from an evil spirit, whose supreme delight consists in counteracting the benevolent plans of Providence. When it thunders, therefore, they vent virulent curses against him.

Thunder, lightning, rain, and winds are constantly employed by the poets to illustrate their subjects. Thus Southey, in his poem of Madoc :

'Tis pleasant by the cheerful hearth to hear
Of tempests and the dangers of the deep,
And pause at times, and feel that we are safe;
Then listen to the perilous tale again,
And with an eager and suspended soul
Woo terror to delight us.

Raphael is said to have imbodied the lightning of the mind; and Gray characterizes the poetry of Dryden in a manner equally poetical :

Behold where Dryden's less presumptuous car
Wide o'er the fields of glory bear
Two coursers of ethereal race,
With necks in thunder clothed, and long resounding pace.

THE RAINBOW.

If we hold green glass to the eye, every object seen through it appears green : hence it may be supposed, that to those insects which have green, blue, or indigo eyes, everything they see appears of a green, blue, or indigo colour. Labrador feldspar exhibits a brilliant display of colours ; but, as with the opal, they all depend on the position in which the

stone is held to the light. Gems, on the other derive their hues from the metals with which are impregnated.

The tintings of the clouds are caused by the refrangibility of the sun's rays. These visions, mimic representations—designed, as it were, by the Eternal, in mockery of man's works and as emblem of their instability—charm alike the philosopher prying into the secrets of Nature, and the husband the peasant, who at a greater distance admires the beauties and yields to her influences. Gaze on my Lelius, on the fine-formed arch of the rainbow and be enraptured with its splendour as it ends at the horizon on the extended plain, or hangs from the side of the lofty mountain.

I do not remember that it has been expressed by our philosophical writers, but it is nevertheless evident that the ancients had a knowledge of the rainbow's being formed by the refraction of the sunbeams and the falling of rain. We may infer this from the allegory of the winds in the *Æneid* from what Ælian says of Pythagoras; from a sage in the fifth *Eneid*,* and another in the book of Lucretius.†

Nothing can be more express than the language of Pliny: "*Quod ergo iris sit refractionis aspectus solem, manifestum est.*" And as Plutarch declares to have been a circumstance well known in his time it is difficult to conceive why, in the present, *Domino de Dominis*‡ should be honoured as a discoverer.

* *Ceu nubibus arcus
Mille trahit varios adverso sole colores.*

Lib. v.,

Martial also:

Cæsuras alto sic rapit Iris aquas.

Lib. xii., ep. xxi.

†

Huic, ubi sol radiis, &c,

De Rer. Natur., vi.,

‡ In his "*De Radiis Visus et Lucis*," wherein he improves a hint given by Vitello, in a treatise published in the 17th

rather than a reviver of a truth which Descartes more fully explained,* and which Newton completely illustrated by analyzing the properties of colour.

The poets feigned the rainbow to be the abode of certain aerial creatures, whose delight it is to wanton in the clouds; and Milton, in his exquisite pastoral drama, thus alludes to this fanciful idea :

I took it for a fairy vision
Of some gay creatures in the element,
That in the colours of the rainbow live,
And play in th' plighted clouds.

The rainbow, which not improbably first suggested the idea of arches, though beautiful in all countries, is more particularly so in mountainous ones; for, independent of its greater frequency, it is impossible to conceive an arch more grand, if we except the double ring of Saturn, than when its extreme points rest upon the opposite sides of a wide valley, or on the peaked summits of precipitate mountains.

One of the glories which are said to surround the throne of Heaven is a rainbow like an emerald. In the Apocalypse it is described as encircling the head of an angel; in Ezekiel, four cherubim are compared to a cloud arched with it; and nothing out of the Hebrew Scriptures can exceed the beauty of that passage in Milton, where he describes its creation and first appearance. There is a picture representing this emblem of mercy, so admirably painted, in the castle of Ambras, in the circle of Austria, that the Grand-duke of Tuscany offered a hundred thousand crowns for it. Rubens frequently gave animation to pictures which had little besides to interest the eye of the spectator, by painting this

rus Opticæ, 1572, in which he says "that refraction as well as reflection do produce a rainbow."

* Descartes showed that the *first* bow is formed by one reflection and two refractions; and the second by the sun's rays' falling upon drops of rain, and emerging after two refractions and two reflections.

phenomenon : one of Guido's best pieces represents the Virgin and Infant sitting on a rainbow ; and round the niche in which stood a statue of the Virgin in the chapel of Loretto, were imbedded precious stones of various lustres, representing the hues of the rainbow.

The rainbows of Greenland are frequently of a pale white, fringed with brownish yellow, arising from the rays of the sun being reflected from the frosty vapours in the air. In Iceland it is called the "Bridge of the Gods," and the Scandinavians gave it for a guardian a being which they called *Heimdallar* : they supposed it to connect heaven with earth.

Ulloa and Bouguer describe circular rainbows,* which are frequently seen on the mountains rising above Quito, in Peru ; while Edwards asserts that a rainbow was seen near London, caused by the exhalations of that city, after the sun had set more than twenty minutes. A naval friend informs me that as he was one day watching the sun's effect upon the exhalations near Juan Fernandez, he saw upward of five-and-twenty *ires marinæ* animate the sea at the same time. In these marine bows, the concave sides were turned upward, the drops of water rising from below, and not falling from above, as in the aerial arches. They are sometimes formed by waves, also, dashing against the rocks.

In some rainbows may be discovered three arches within the purple of the common bow : 1. yellowish green, darker green, purple ; 2. green, purple ; 3. green, purple. Rainbows are sometimes seen, also, when the hoar-frost is descending ; and Captain Parry, in his attempt to reach the North Pole by boats and sledges, saw a fog-bow, and no less than

* When M. Labillardière was on Mount Teneriffe, he saw his body traced on the clouds beneath him in all the colours of the solar bow. He had previously witnessed this phenomenon on the Kesrouan, in Asia Minor.—D'Entrecasteaux's *Voy. in Search of La Pérouse*, vol. i., p. 18, 19.

five other complete arches formed within the main one, all beautifully coloured.

Often have I stopped, even in the streets of London, to gaze on haloes of the moon. Haloes are much more rare in northern countries than in southern. Humboldt relates, that in the torrid zone they appear almost every night. They are seen, also, round the planet Venus, the purple, the orange, and the violet being distinctly perceived; none are observed, however, round Sirius, Canopus, or any other of the fixed stars. Dr. Halley saw at Oxford a beautiful halo round the moon, within the circumference of which were Saturn, the Pleiades, Capella, and the foot of Perseus.

Aristotle asserts that he was the first who ever noticed a lunar rainbow. He must mean that he was the first who ever *described* one, since lunar rainbows must have been observed in all ages. That it was unknown to St. Ambrose, however, is evident from his belief that the bow, which God promised Noah he would place in the firmament after the Deluge, "as a witness that he would never drown the world again," was not the rainbow, "which," says he, "*can never appear in the night*, but some visible virtue of the Deity." Notwithstanding the incredulity of St. Ambrose, however, I have had the good fortune to see several myself, two of which were perhaps as fine as could be witnessed in any country. The first formed an arch over the Vale of Usk. The moon hung over the Blorenges; a dark cloud was suspended over Myarth, and a bow, illumined by the moon, stretched from one side of the vale to the other. The second I saw from the castle overlooking the Bay of Carmarthen, forming a regular semicircle over the Towy.

THE AURORA BOREALIS.—ZODIACAL
LIGHT.

At the North Cape, Acerbi felt as if all the cares of life had vanished; worldly pursuits assumed the character of dreams; the forms and energies of animated Nature seemed to fade away, and the earth appeared as if it were about to revert to its original elements. A solemn magnificence, an interminable space, wearing the aspect of infinity, characterized the scene. The billows dashed in awful grandeur against rocks coeval with the globe; marine birds, wild in character and dissonant in language, skimmed along their girdles; the moon shed her solemn lustre on their dark and frowning pyramids; the stars glowed with burnished brilliancy; and the *Aurora Borealis* added terrific interest to the gloomy majesty of the whole.

And what can be more awful, and, at the same time, more beautiful, than the wild and mysterious motions and colours which this polar phenomenon presents? sometimes covering with inconceivable magnificence the concave of the whole hemisphere, changing its positions every moment; now resembling vast pyramids, or stretching into innumerable columns, varying their shapes and hues with astonishing rapidity and with endless caprice; now vanishing in an instant, leaving the heavens sombre and black; and again suddenly returning with increased splendour, shedding a matchless glory over all the sky.

The appearance of this phenomenon has been looked upon by the superstitious and ignorant with no small alarm, as foreboding war, pestilence, or some other direful calamity. Spenser alludes to this in his *Faerie Queene*, and Thomson, still more particularly, in his philosophic poem of the *Seasons*.

From look to look, contagious through the crowd
 The panic runs, and into wondrous shapes
 Th' appearance throws : armies in meet array
 Throng'd with aerial spears and steeds of fire,
 Till the long lines of full-extended war,
 In bleeding fight commix'd, the sanguine flood
 Rolls a broad slaughter o'er the plains of heaven.
 As thus they scan the visionary scene,
 On all sides swells the superstitious din,
 Incontinent, and busy Phrensy talks
 Of blood and battle, cities overturn'd,
 And late at night in swallowing earthquake sunk ;
 Or hideous wrapp'd in fierce ascending flame ;
 Of fallow famine, inundation, storm ;
 Of pestilence, and every great distress ;
 Empires subvers'd, when ruling Fate has struck
 Th' unalterable hour : even Nature's self
 Is deem'd to totter on the brink of time.

With respect to the cause of this phenomenon, many hypotheses have been started by philosophical writers. St. Pierre supposes it may be occasioned by the coruscations of the ice within the polar circles, the approach to islands of ice being frequently indicated some time before they appear in the horizon by the coruscations they emit.*

This hypothesis gains some support from the circumstance observed by travellers in Lapland and Siberia of the aurora being attended by a hissing and crackling sound. An insuperable objection to it, however, is, that if the phenomenon alluded to proceeded from the coruscations of the polar ice, it would make its appearance regularly every year ; whereas it is seen only occasionally, and in ancient times was still more rare.†

Some have imagined it to proceed from the ice islands themselves, which float at particular seasons of the year along the Northern and Southern Oceans,

* Ice-blinks are visible at a considerable distance, and by their effulgence may be seen in the thickest fog and in the darkest night.—Mem. Wernerian Society, vol. ii., p. 292.

† The first appearance of it recorded in England is, I believe, by William of Malmesbury, p. 177.

grounding their opinion principally upon Captain Cook's having observed that the ice islands at the South Pole illumined half the horizon to a considerable height. But this hypothesis is even more improbable than the former. It is liable to the same objection we have urged against that, with the addition of the seeming impossibility that any coruscations proceeding from objects so comparatively low as these islands should ascend to an altitude of several thousand miles ; a height to which, in the opinion of many philosophers, particularly Euler and Mairan, the illuminations of the aurora ascend. To add to the difficulty, it has been observed by different travellers in Iceland, that the northern lights ^{summit} rise up from the east and southeast as well as from the north. In Greenland they generally proceed from the east. In Lapland, frequently from the south.* In Hudson's Bay they resemble an umbrella, with streams of light darting from every part of its periphery. At the equator it is seldom if ever seen.

Franklin supposed the aurora to be owing to vast quantity of electricity accumulated in the atmosphere, and which is unable to pass off into the earth, on account of the non-conducting nature of ice, and the land and seas in the polar regions being incrustated with it. Some have also supposed it to be connected with the magnetic fluid ; but Captain Parry, when in the Arctic Regions, could not perceive that it affected the magnetic needle in any degree. It neither altered its polarity, nor even so much as caused a single tremulous motion.†

* The result of Captain Ross's voyage proves that it appears in every direction, and not unfrequently at small distances from the earth.—Vid. Voy. of Disc. to Arctic Regions.

† Professor Hansteen, of Christiana, believes the earth to have four magnetic poles, and that the moon and the sun have magnetical poles also. He supposes the aurora lights to be magnetical currents flowing from one magnetical pole to the other immediately opposite ; that they have the form of a luminous cross where they first appear ; and that there are four luminous

In respect to the iceblink, Martin describes it as an arch formed upon the clouds by reflection from packed ice. This reflection sometimes presents a perfect map of the ice twenty or thirty miles beyond the limits of direct vision.

Some navigators assert that icebergs exhibit green and blue colours by day, but none by night; others, among whom is Captain Ross, that they have most beautiful colours by night as well as by day, displaying a variety beyond the power of art to represent. In these northern regions it is curious that lenses may be formed of ice, which, without melting, will, when the sun is powerful, light matches, fire gunpowder, and even melt lead.

The ZODIACAL LIGHT presents also a very beautiful appearance. It is said to have been first discovered by Cassini in the year 1683; yet who can doubt that it has exhibited itself in all ages? It is seen only in the zodiac, and best in the month of March, after the setting of the sun. Its figure resembles an inverted pyramid, with its base towards that luminary. Humboldt says it often displays itself in this shape in the Caraccas, as well as among the Cordilleras of Mexico; and La Caille speaks with great admiration of its appearance between the tropics, as he was sailing from Rio Janeiro to the Cape. M. de Marian thinks this phenomenon to be the cause of the aurora borealis, and associates both with the atmosphere of the sun. My own opinion is, that both may be ascribed to the same cause, and that they are occasioned by a peculiar state of the electric fluid.

crosses, two in the northern hemisphere, and two in the southern, elevated from four to five hundred miles above the earth

FATA MARGANA.

BUT of all the phenomena of nature, that which produces in the mind the noblest emotion as the Fata Margana of the Straits of Messina: a phenomenon which conjures up in reading the descriptions of the Arabian poets. The Sicilians therefore consider it to be the most beautiful sight in nature.

Minasi has written a dissertation on this phenomenon, which is thus described by Father Angelucci: "As I stood at my window, I was surprised with a wonderful vision. The sea that washes the Sicilian shore swelled up, and became for ten miles in length like a chain of dark mountains, while the water near our Calabrian coast in an instant appeared as one clear polished mirror, reclining against the ridge. On this glass was depicted, in chiaroscuro, a string of several thousand pilasters, all equal in altitude, distance, and degree of light and shade. In a moment they lost their height, and bent into arcades like Roman aqueducts; and a long colonnade was next formed on the top, and above it rose pinnacles innumerable, all perfectly alike. They then split into towers, which were shortly after like colonnades; then windows; and at last they were hid in pines, cypresses, and other trees even to the lar. This is the FATA MARGANA, which for six years I thought a mere fable." Such is the account of this surprising phenomenon, derived by Swinburne from Father Angelucci.* It is supposed

* Vernet, says St. Pierre, "was one day greatly surprised to perceive in the sky the appearance of a town turned upside down, and to distinguish perfectly the steeples, towers, and houses. He lost no time in sketching this phenomenon, and determined to ascertain its cause, he proceeded, following the same point of the compass, into the mountains. But how great

by M. Howel to be caused by a bitumen issuing from certain rocks at the bottom of the sea; the subtle parts of which, being attenuated and combined with the vapour, give it more consistence, and form a kind of aerial crystal, "which receives the light, reflects it to the eye, and transmits it to all the luminous points which colour the objects and render them visible." Others attribute it to electrical causes.*

was his surprise on finding, at a distance of seven leagues from the spot, the town of which he had seen the reflection in the sky, and of which he had a sketch in his portfolio."

The most remarkable consequence of the refraction and reflection of light is the numerous atmospherical deceptions which are thereby produced. Places at a considerable distance are sometimes unexpectedly brought within the sphere of vision. Thus, in the year 1788, the coast of France was distinctly seen at Hastings. Towns, hills, valleys, islands, ships, &c., have been seen reflected in the heavens. In the county of Huntingdon, on the morning of July 16, 1820, at half past four o'clock, the sun then shining in a cloudless sky, and the light vapours that arose from the River Ouse moving over a little field near St. Neots, suddenly the village of Great Paxton, its farmhouses, barns, dispersed cottages, trees, and grass-fields, were clearly and distinctly visible in a beautiful aerial picture, which extended from east to west about four hundred yards. Nothing could exceed the surprise and admiration of the spectators as they beheld this surprising phenomenon, nor their regret at its disappearance in about ten minutes.

* The SPECTRE of the BROKEN is thus described by the Abbé Haüy. "Having ascended the mountain thirty times, I at last saw the spectre. It was at sunrise in the middle of May, about four o'clock in the morning. I saw distinctly a human figure of a monstrous size. The atmosphere was quite serene towards the east. In the southwest, a high wind carried before it some light vapours, which hung round the mountains upon which the figure stood. I bowed. The colossal figure repeated it. I paid my respects a second time, which was returned with the same civility. I then called the landlord of the inn; and, having taken the same position which I had occupied, we looked towards the mountain, when we saw two such colossal figures, which, after having repeated our compliments in bending our bodies, vanished. When the rising sun throws his rays over the Broken upon the body of one standing opposite to fleecy

MIRAGES.—ELECTRICAL APPEARANCES.

OPTICAL illusions are also frequently witnessed in hot countries just above the surface of the earth. These illusions are called **MIRAGES**. Humboldt saw one near the confluence of the Apure with the Orinoko, another in Caraccas, and a third in the Queen's Gardens. "When the sun appears," says he, "the trunks of trees and rocks seem suspended in the air; and on the neighbouring beach the sands present the visual illusion of a sheet of water; a train of clouds suffices to seat the trunks of the trees and the suspended rocks again on the soil, to render the undulating surface of the plains motionless, and dissipate the charm which the Arabian, Persian, and Hindu poets have sung, as the soft delusion of the solitude of the desert." Johnson saw one on the northern borders of Persia, and Elphinstone another as he was travelling in Caubul, which seemed to exhibit a clear lake, and which reflected the figures of two gentlemen who were riding by its side as distinctly as if it had really been water.

These mirages are very frequent in Egypt, where two villages will appear like islands in the bosom of large sheets of water, with their inverted images as clearly defined as if they were real. These are described by Monge, Biot, and Belzoni.

The northern coast of Greenland, fringed with ice, reflecting all the primary colours of the sun's rays, often appears like an enchanted land; and in the country north of Hudson's Bay, where the animals all wear the livery of winter, where wine freezes, and where rum and brandy coagulate, lunar

clouds, let him fix his eye steadfastly upon them, and in all probability he will see his own shadow extending the length of five or six hundred feet, at the distance of about two miles from him."

haloes and parhелиas are frequent, sometimes stealing, as it were, colours from the rainbow. The stars appear crimson, and the aurora borealis is witnessed almost every night. In Spitzbergen, also, are seen many phenomena common to Greenland and Baffin's Bay, while at a distance from the coast are beheld large ice islands, floating in majestic masses like mountains. Against these the waters of the ocean are perpetually dashing, sometimes as high as their girdles, where, freezing, they form those curious pictures, which an active imagination converts into towns, villages, steeples, and temples. These, beheld in a hemisphere illumined by the aurora, where the stars are reflected from the snow, and the moon preserves a distinct horizon, present curious, eloquent, and awful pictures of magnificence.

Baron de Humboldt, when he was in the city of Cumana, witnessed a violent earthquake. A few days after, thousands of fireballs and falling stars were seen in the sky, rapidly succeeding each other for the space of several hours. From many of these stars issued irradiations like rockets and other fireworks. From what a height some of these meteoric appearances descended, may be inferred from the circumstance that innumerable falling stars and bolides, seen from three till six in the morning, were also observed at Maroa, 174 leagues southwest of Cumana; at San Gabriel, near the equator; on the frontiers of Brazil, 230 leagues from Cumana; also in the Gulf of Florida; in Labrador and Greenland, and even at Weimar, in Germany. To be seen at such wide distances, these meteors must have been, according to Humboldt's calculation, 1233 miles in height. But it is more probable that these phenomena were not the same: the higher regions of the atmosphere, from some unknown cause, might have been in a state, through the whole of the area mentioned, peculiarly favourable to the production of

myriads of what the same philosophic traveller calls "incandescences."

Men lived in and breathed electrical fluidity many thousand years, without being in any way conscious of its existence. This circumstance alone should be sufficient to place men on their guard how they fall into atheism when anything is seen, or an event occurs, of which they are unable to discover the immediate cause.

The cause of lightning is now generally understood: we shall, therefore, merely allude to a few instances of electrical phenomena.

Bosman relates, that during his stay at Elmina he found some old papers, in which it was recorded that, in a violent storm which occurred in 1651, the lightning had not only melted several swords without singeing the scabbards, but melted gold and silver without consuming the bags.

Sometimes lights are seen upon the mastheads of ships. Dampier saw one in the Chinese seas after a violent storm of rain and thunder. It resembled a star; and Camoëns alludes to a similar phenomenon in the *Lusiad*. It is called by the Spanish and Portuguese, *Corpus Sanctum*; they esteem it an omen of fine weather, and go to prayers the moment they observe it.

Sometimes the entire sea appears like a floating mass of electrical fluid. On the coasts of New-Guinea are seen, for many leagues, a vast profusion of minute substances during the night. They are also observed on the coast of New-Holland, where they are generally of a grayish colour. In some seas they are red, and hence the fables of seas of blood, with which the world has occasionally been amused. Sailors call this collection sea sawdust. On the Australasian coast, Peron discovered, during a squall of wind, a broad belt of phosphoric light floating upon the water. Upon examination, he found it to proceed from innumerable animalculæ,

swimming at different depths. These proved to belong to a new genus of mollusca, to which Peron gave the name of pyrosoma.

The phosphorescent matter on the African coast is glutinous. In rainy nights it is not observable, but when the stars or the moon shine brightly, it is remarkably brilliant. The bodies composing this mass are regularly organized, and Dr. Solander and Sir Joseph Banks therefore naturally supposed them to be the spawn or eggs of a certain species of marine animal. These animalculæ are confined almost entirely to tropical seas. When they are separated from the water, it loses its phosphorescence, and the animalculæ soon lose it themselves when exposed to the dry air.

The province of New-Biscay, in North America, has an atmosphere which is sometimes so highly electrical, that sufficient matter may be collected from the fur of a bear to give considerable shocks; and as Saussure and Jalabert were crossing the Alps, they encountered several thunder-clouds, when they discovered their bodies to be so full of electrical fire that flashes darted from their fingers, their joints cracked, and they felt the same sensation as though they had been electrified by art.* On the coast of Upper Guinea, the atmosphere is frequently electrified to an astonishing degree. When Labillardière was sailing in those seas, he saw, during a dark night, a luminous column of great extent issue from under the clouds, and alight on the surface of

* The electric fluid will not melt ice or any congealed substance. It will not pass through hard stones, amber, oils, dry air, sulphur, or the ashes of animal and vegetable substances. In respect to the principal metals, they are all conductors; the best being gold, and the worst, lead. Wood, in its green state, is a conductor; but when it is baked, a non-conductor. When it is burned to charcoal, it resumes its conducting qualities; but when reduced to ashes, it again becomes a non-conductor. The manner in which the electric fluid produces death is unknown, as no injury on the vessels or intestines appears on dissection.

I remained in Zante," says he, "an extraordinary phenomenon occurred. At the end of February there was a torrent of rain, with which were mixed vast quantities of reddish sand, that soon darkened every window in the place. This the inhabitants attributed to a strong south or southwest gale, bringing that substance from Egypt or the deserts of Africa."

Red snow has been observed among the Alps; Raymond mentions it, too, among the Pyrenees, at the height of 2000 and 2500 yards above the level of the Bay of Biscay. Saussure attributes that of the Alps to the seminal powder of certain plants peculiar to high mountains; but Raymond to the mica, which abounds so much in the Pyrenees as to colour the water as the snow melts. Sarotti saw red snow, also, among the mountains north of Genoa, and Martin near the seven Icebergs in the Northern Seas.

In the year 1810 (Jan. 17) red snow fell upon the mountains of Placentia, in Italy, particularly on the Cento Croci. For some time snow had lain upon those mountains; but on this day peals of thunder were heard, accompanied by several vivid flashes of lightning, and the snow that fell immediately after was red: then white snow fell, and thus the red became enclosed between two strata of white. By this it appears that red snow has some connexion with the electrical state of the atmosphere. Some of the snow which Captain Ross found in the Arctic Regions he preserved in three states: dissolved, the sediment bottled, and the sediment dried. Upon the analyzation of these specimens, Dr. Wollaston coincided in opinion with Captain Ross, that the redness was occasioned by a vegetable substance, produced on the mountain above the spot where the snow lay. It was not seen at a distance of less than six miles from the sea, and always on the face or at the foot of a mountain. When analyzed it appeared to consist of minute globules from $\frac{1}{1000}$ to $\frac{3}{1000}$ of

an inch in diameter; the coat colourless, and the contents of an oily nature; which, though not soluble in water, was soluble in rectified spirits of wine; and, when dried by the heat of boiling water, it sustained no loss of colour.*

AERIAL COLOURS.

WHAT is there more delightful than to watch the changing colours of the aerial landscape, when the sun is rising in all his glory, or setting in all his majesty?† Or when the moon, ascending in full-orbed splendour, tinges the edges of the clouds with saffron, and depicts rivers, and plains, and mountains along the circle of the horizon?

These appearances, lovely as they are in our hemisphere, are far less so than those observed in more southern climates. "In California," says Humboldt, "the sky is constantly serene, of a deep blue, and without a cloud. Should any appear for a moment at the setting of the sun, they display the finest shades of violet, purple, and green. All those who have ever been in California, preserve a recollection of the extraordinary beauty of this phenomenon."

In Japan clouds are seen to assume the shapes of irregular fortifications, giving great richness and variety to the ethereal concave. In the tropics

* M. Bauer says that the particles colouring the snow red consist of a species of the uredo, a fungus, a perfect globule of which is so small that 2,560,000 occupy the space of only one square inch.

† Milton has imagined a splendour which only the imagination of a poet is capable of picturing to the fancy. Adam, observing the approach of Raphael, describes him as

Another morn

Risen on mid-noon!

Isaiah declares that in the day of grace the light of the moon shall be as the light of the sun, and that of the sun sevenfold.

they roll themselves into enormous masses as white as snow, turning their borders into the forms of hills, piling themselves upon each other, and frequently exhibiting the appearance of caverns, rocks, and mountains. There, as may be collected from St. Pierre, may be perceived, amid endless ridges, a multitude of valleys, whose openings are distinguished by shades of purple and vermillion. These aërial valleys exhibit among their different colours matchless tints of white, sinking into every variety of hue. Here and there may be observed torrents of light issuing from the dark sides of the mountains, and pouring their streams, like liquid gold and silver, over rocks of coral. These exhibitions are not more to be admired for their beauty than for their endless combinations, as they vary every instant: what a moment before was luminous, becomes coloured; and what was coloured mingles into shade, forming singular and most enchanting representations of islands and hamlets, bridges stretched over wide rivers, immense ruins, huge rocks, and gigantic mountains.

The clouds which precede the typhons in the East pile up their rounded summits, move simultaneously along, and exhibit volume rising above volume in magnificent regularity. The edges are fringed with various colours from faint yellow to deep crimson, towards the middle becoming of a copper colour, while the body of the cloud is of a deep sable.

Those who, from the tops of high mountains, have beheld the clouds rolling along the lower regions of the air, always retain a lively recollection of the grandeur of the scene. When Dr. Kraskovitz made his sixth ascension at Vienna, no feeling, he says, that he ever experienced, would compare with the transport with which he beheld the silver shroud of vapour beneath him, appearing like a solid silver-coloured mass, with the summits of Styria and Hungary

rising through it; while above, the heavens were pure and serene, and the moon and the sun vying with each other, as it were, to render the universe more splendid and magnificent.

In the southern hemisphere the nights are ~~more~~ *dark* than in the northern, and there are fewer stars. Towards the north pole the skies are serene, and the stars exceedingly brilliant, and, with the snow beneath illumined by the moon, the entire midnight landscape appears as if it were studded with gems. The stars are of a fiery red, and the sun rises and sets with a light inclining to a yellow glow. On the summit of Mont Blanc, the snow reflecting with dazzling brilliancy, the moon rises in all its splendour in the midst of a sky as black as ebony; while at the southern cape of Africa, when the south winds prevail, she appears to have an undulating motion, the stars at the same time revolving in a fantastic manner, and the planets seeming all bearded like a comet.

The clouds among the Highlands of Scotland frequently display the finest outlines, and assume the loveliest shapes, especially when viewed from their wild and lofty summits. Beattie finely alludes to these appearances in his poem of the Minstrel:

Oft when the wintry storm had ceased to rave,
He roam'd the snowy waste at even, to view
The clouds, stupendous, from the Atlantic wave
High towering, sail along the horizon blue:
Where, mid the changeful scenery, ever new,
Fancy a thousand wondrous forms describes,
More wildly great than ever pencil drew;
Rocks, torrents, gulfs, and shapes of giant size,
And glittering cliffs on cliffs, and fiery ramparts rise.

In the tropical climates the stars seem whiter than in the northern, owing to the greater transparency of the air. Humboldt and Bonpland once saw Jupiter distinctly with the naked eye, eighteen minutes after the sun had appeared in the horizon, so clear is the atmosphere at Cumana. On Mont Blanc, Jupi-

ter may be frequently seen several hours after the sun has risen. Among the Alps the sky is of an intense azure; a circumstance which we may attribute to the colour of the air not being dimmed by vapours, which cause the rays of light to separate and disperse. In the tropics, the sky, seen through the green boughs of the forests, appears like indigo, and the sea is of a pure dark azure.

At the Lake Manasanawara, among the Himalaya Mountains, the moon in a total eclipse is much more clear and transparent than in the regions below, owing to the rarity of the atmosphere extenuating the shadow of the earth.

In Italy, in Spain, and in the south of France, circles round the moon are frequently seen: in those climates, too, the twinkling of the stars is generally accompanied by sudden changes of colour, and between the equator and the 15th degree of latitude small haloes are often observed round the planet Venus. In these aureolas, the orange, violet, and purple are particularly to be distinguished, and yet Boupland remarks that he never once saw any similar prismatic appearances about Canopus or the Dog-star. These haloes are most frequent in the finest weather.

In the Island of Madeira, and along the coast of Africa, Humboldt was never weary of admiring the serenity and transparency of the sky at night, when he beheld innumerable falling stars, shooting almost every instant. These phenomena became more frequent after he passed the Canaries, and still more so in that part of the Pacific which bathes the volcanic shores of Guatemala. Some of these meteors left tails which continued luminous from twelve to fifteen seconds. While he was climbing the broken lavas of the Malpays, he saw several optical phenomena, which appeared like small rockets shot into the air. These he found afterward to be the images of stars magnified by vapours.

What poet beholds the blush of morning with feeling that vernal delight which recalls to him the mother of Memnon and Guido's mother-ses! On the ceiling of the palace of Rospigliosi this picture still remains. There Aurora is represented glowing with beauty and attended by the Hours, while Love, bearing a flambeau, waves over the universe. Immediately the ocean, which had previously been enveloped in darkness, catches the flame, and the waves become illumined with splendour.

Newton believed the blueness of the sky was owing to vapours, of sufficient consistence to deflect the violet rays, but not the others. Leonardo da Vinci, on the other hand, attributed it to the immense depth of the heavens, which, devoid of air, are black, but which, when illumined by the sun, become blue; all black bodies appearing blue when observed through a white medium. This opinion seems to be the more philosophical of the two. If Newton's hypothesis were correct, stars could be seen during the day, whereas they are frequently observed, even at noon, from the bottom of wells and mines.

The shapes and movements of the clouds at times depend on aerial currents, at others on electricity, clouds frequently discharging one electricities into each other. Their colours are produced by the power which they possess, when condensed at certain heights, of dividing the sunlight, and by reflection rendering them various. Such is the cause of yellow, orange, red, and violet in clouds. Green clouds are seldom seen.

Though blueness is the natural colour of the clouds, they reflect every colour in nature, but in every climate. Sometimes they wear the rosy blush of the ardonia tinctura; at others, streaks of blood-like red, resembling riband jasper; now they appear in large brilliant volumes, like native

bar; now of a vivid red, with white spots, like the marble of Languedoc; now with the red bordering on orange, like carnelian; and now they reflect the rich and glowing colour of the carbuncle.

In some climates they assume the hue of the onyx alabaster; in others they are brownish red, interspersed with white spots, like porphyry. Now they are yellow as native gold, and now as white as magnesian limestone. Sometimes, mingling with the azure of the deep serene, veins and spots of white and yellow remind us of the lapis-lazuli, while at other times they are of a blue more deep and beautiful than marine.

To the beauty of the aerial tintings Mons. Necker was peculiarly sensible. A few hours after the death of Madame Necker, Madame de Staël found him standing at one of the windows of his chateau, overlooking a magnificent prospect of the Alps, when a cloud passed over the horizon in the distance, and, being coloured with the rays of the morning sun, seemed a fitting vehicle to convey a departed spirit to the regions of bliss. "Perhaps her soul hovers there!" ejaculated Necker, and then relapsed into meditation.

THE SEASONS.

How many are the enjoyments which the progress of the SEASONS affords us! What can be more delightful than that season of the year, when Nature, invigorated by repose, clothes every object in renovated gladness; when the snows are melted away, and the trees are unfolding their newborn leaves; when the flowers are painting themselves with every variety of hue, the unchained rivers rolling joyfully along, and when every hill and thicket are vocal with the songs of birds.

If SPRING be the most delightful season to the

poet, as affording him a greater multiplicity of images, SUMMER is no less captivating to the contemplatist, and AUTUMN to the enthusiast. What can be more transporting than the splendour of the rising sun at this latter season, with all the scene of rural happiness and industry it displays?

An evening and a morning sun, when skirted with bold masses, is said to have fired Barry with ungovernable rapture. Virgil, in his picture of Elysium says that the sun has a purple light at all times and it is from this magnificent appearance of the sky before and after sunset that we associate the idea of beauty and grandeur with purple: hence purple has in most ages been esteemed a royal and imperial colour.

Sensible of these glories of early day, the disciples of Pythagoras, after the manner of their master, prostrated themselves as soon as the disk of the sun presented itself above the horizon. Whenever they saw it they recognised a present Deity. Actuated by the same awful admiration, Aristippus, when at the point of death, directed his friends to carry him to the city gates, and to place his couch immediately opposite the lattice, that he might, to the last moment of life, enjoy the verdure of the fields and the splendour of the setting sun; while Caniz, one of the German poets, when about to expire, requested to be raised from his couch in order to take a last look of that glorious luminary: "Oh," said he, with the sublimity of enthusiasm, "if a small part of the Eternal's creation can be so exquisitely beautiful as this, how much more beautiful must be the Eternal himself!"

This reminds us of the closing scene of PORTER'S BISHOP OF LONDON. "As he sat in his library," says one of his biographers, "near the window, brightness of a fine spring day called up a glow into his countenance, and he several times claimed, '*Oh, that glorious sun!*' Afterward, sitting at dinner, he was seized with some su

convulsions, which were happily, however, of short duration ; and he fell, *as it seemed*, into a gentle sleep—it was the sleep of death. From that time he never spoke, and scarcely could be said to move. Without a pang or a sigh—by a transition so easy as only to be known by a pressure of his hand upon the knee of his servant, who was sitting near him—the spirit of this good man fled from its earthly mansion to the realms of peace !”

So enthusiastic an admiration had Eudoxus for this luminary, says Plutarch, that he would willingly have suffered the fate of Phaëton for the delight of approaching it. He prayed, therefore, to the gods, that he might once be permitted to see it so closely as to be able to comprehend its form, magnitude, and beauty, and then die by its beams.*

It is curious, yet melancholy, to observe with what atheistical horror some theologians have listened to arguments derived from the appearances and wonders of Nature. An instance of this kind occurred not long since in Spain, where a prisoner was gagged at an *auto de fé* merely because, after having been confined many years in prison without seeing the light of the sun, he was seized with such rapture at again beholding it, that he exclaimed, in

* Bernardo Tasso was so captivated with the sun, that he began all the cantos of his *Amadigi* with a description of its rising, and finished them with a description of its setting.

“ I had been apprized not to visit Monsieur le Sage,” says the Count de Tressan, “ till near the approach of noon ; and the feelings of that old man made me observe, for a second time, the effect which the state of the atmosphere produces in the melancholy days of bodily decline. Monsieur le Sage, awaking every morning so soon as the sun appeared some degrees above the horizon, became animated, acquired feeling and force in proportion as it approached the meridian ; but, as the sun began to decline, the sensibility of the old man, the light of his intellect, and the activity of his bodily organs began to diminish in proportion ; and no sooner had it descended some degrees beneath the horizon, than he sunk into a lethargy from which it was difficult to rouse him ”

the ardour of enthusiasm, "How is it possible that men who look upon that glorious orb can worship any other being than the one who created it!"

Rousseau, in his last illness, was heard to ejaculate, "Oh! how beautiful is the sun! I feel as if he called my soul towards him!" Indeed, the sun is so glorious a body, that it can hardly excite our wonder that, in the more early and ignorant ages, it should have received the honours of deification. Josephus informs us that the people of Judah issued out of the eastern gate of the city to salute the sun on its first rising. The sun, as well as the moon, was worshipped by the ancient Egyptians and Germans, and by the British Druids. The Persians worshipped it also; but they did not for many ages permit any symbol to be made of it. Such was the creed of the first Zoroaster;* the second, however, commanded the erection of temples, and the institution of the sacred fire.

In Egypt the sun was regarded as hieroglyphical of the fructifying power; in Greece it was an emblem of human life, and in Rome of the sovereign majesty of the empire.

In the finest of all soliloquies—that of Satan on contemplating the splendour of the sun—the hatred of the fiend does not debar him from acknowledging how worthy that luminary is of wonder and admiration:

O thou, that with surpassing glory crown'd,
Looks from thy sole dominion, like the God
Of this NEW WORLD; at whose sight all the stars
Hide their diminished heads; to thee I call,
But with no friendly voice, and add thy name,
O SUN, to tell thee how I hate thy beams;
That bring to my remembrance from what state
I fell; how glorious once above thy sphere.

Worship of the Sun.—The Persians worshipped

* There appear to have been five Zoroasters: 1st, the Chaldean; 2d, the Bactrian; 3d, the Persian; 4th, the Pamphylian; and, 5th, the Armenian.

the sun under the name of Mithras : a deity who, in the times of Statius and Claudian, was venerated at Rome. On his altar was inscribed *Soli Deo invicto Mithræ*. But there existed in Persia a sect which thought higher and more nobly. When they looked at the sun, therefore, they were accustomed to ejaculate, " Oh, thou master of yon glorious orb ! enlighten my mind, and keep me this day from evil." The fire-worshippers of Persia and India do not believe the sun itself to be the deity, but that his throne is centred there.

By the Massagetæ, the Germans, the British Druids, and, indeed, by nearly all the nations of ancient times, the sun seems to have been venerated as a god. The Chaldeans worshipped him under the name of Baal ; the Egyptians, under that of Osiris ; the Syrians, of Adonis ; the Greeks and Romans, of Apollo. The Massagetæ, the Scythians, and the Romans sacrificed white horses to him ; the Greeks, wolves, lambs, bullocks, and hawks ; and Alexander offered up the elephant which had fought with him so bravely in his war with Porus.

The Peruvians were accustomed to dip the tip of their fingers in their cups, then lift their eyes to heaven, and offer the sun thanks for what they were about to drink : indeed, the sun was their principal deity. He was once adored, also, in Macassar, the natives of which likewise venerated the moon and the stars. One of their kings, however, became at length weary of this national worship, in consequence of some Christian and Mohammedan missionaries having arrived in that island. After listening attentively to both, the king ascended a high mountain, accompanied by a great multitude, and, stretching out his hands, invoked the Deity, declaring, at the same time, that he would embrace that religion, the ministers of which should first arrive in his dominions ; and that, as the winds and waves rose and fell by the express power of the Deity, the Deity would

himself be to be blamed if, under these circumstances, he should cause him to adopt an erroneous faith. After this declaration he sat down, and with his people waited the result. Mohammedan missionaries soon after arrived, and the natives of Macassar immediately embraced their religion, in which they have continued to this day.

We are told that, when a native of Sumatra beheld a clock, and was made sensible of its uses, he said, "The sun is a machine of similar construction." "But who winds it up?" inquired one of his companions. "Who but Allah?" was the reply.

The Arabs of South Barbary pray five times a day; and, though they no longer pay adoration to the sun, they are regulated by its motions in the observance of their religious duties. At the first blush of morning they thank heaven for the repose they have enjoyed during the night; at the rising of the sun they pray to be blessed through the day; at noon, that the day may terminate to their profit; at the setting they give thanks for the day past; and at evening they pray for a calm and quiet sleep.

"Let not the sun go down upon thy wrath." Alluding to this injunction of St. Paul, Bishop Horneck relates from ecclesiastical history, that two bishops having quarrelled in a most intemperate manner, one of them sent to the other the following message: "Brother, the sun is going down." Upon receiving this message, the offended bishop forgot his anger, ran to the house of his episcopal brother, fell upon his neck, and kissed him.

When the sun reluctantly sinks beneath the horizon, and the glow of heaven sits, as it were, upon the mountains; when the whole concave is robed in purple splendour, how soft, how soothing and serene are all the objects of the vast creation! As the evening advances, the faith of astronomy insinuates itself into the soul, like the soft vibrations of the most delicate music, emanating from amid the

compass and grandeur of the noblest and sublimest of harmonic sounds. In this repose of the passions evening diffuses a fascinating charm, and every star, as it were, becomes the mother of devotion.

Sweet is the lucid morning's op'ning flower,
Her choral melodies benignly rise,
Yet dearer to my soul the shadowy hour,
At which her blossoms close, her music dies;
For then mild Nature, while she droops her head,
Wakes the soft tear 'tis luxury to shed.

Watching the emersion of Jupiter's satellites, contemplating the two thousand five hundred stars in the constellation of Orion, or viewing the whole capacious firmament, every system that we see hymns, as it were, an unceasing hallelujah.

AUTUMN, the most solemn and affecting season of the year, succeeds; and the soul, dissolving, as it were, into a spirit of melancholy enthusiasm, acknowledges that silent pathos which governs without subduing the heart. For Nature now robes herself in a more sober mantle; the mountains assume a deeper hue, the torrent a bolder swell; the woods are coloured with every variety of tint, and the clouds roll themselves into a thousand magnificent volumes.

This season, so sacred to the enthusiast, has been in all ages selected as a favourite theme for poetic description and moral reflection; since now, all nature, verging towards decrepitude, reminds the young as well as the old of the shortness of life and the certainty of its decay. This reflection gave occasion to many of the ancient poets to draw a comparison between the succession of the seasons and the progress of human life; and, since they were unenlightened on the great argument of futurity, the subject in their hands became pensive and ungrateful. Melancholy allusions to the renovation of natural objects and the eternal sleep of man are, therefore, but too frequent among the ancient poets, a stri-

king instance of which occurs in the poem of Moschus on the death of Bion, imitated by Horace in the eighth ode of his fourth book. To these complaints the whole doctrine of the Christian Testament furnishes a beautiful reply, and in no part of that consolatory book more than in the writings of St. Paul. Whatever may have been his reading, and whatever may be his faith, we may triumphantly challenge the boldest of critics to produce a poem more admirable in the choice of language, more strikingly uniting the solemn and magnificent in manner, and more productive of sublimity of feeling, than the 15th chapter of St. Paul's first Epistle to the Corinthians. To those whose hopes of immortality rest upon so firm a basis, **AUTUMN**, presenting nothing from analogy that ought to excite their fears or to weaken their confidence, affords additional argument for their hopes, by animating the future with the promise of an eternal spring.

WINTER, ushered in by the howling of storms and the rushing of impetuous torrents, closes the year, still affording ample means of enjoyment (which the vicious never dream of), where sympathy and social endearment spread their charms around. Seated by the cheerful fire, among friends, loving and beloved, our hopes, our wishes, and our pleasures are all there concentrated, and the world—vain, idle, and offensive as it for the most part is—presents little to the imagination, and still less to the judgment, that can induce the enlightened and the good to regret their seclusion from it.

BEAUTIFUL SOUNDS.—SUBLIME SOUNDS.

Who has not listened with satisfaction to the song of the lark, the hum of bees, and the murmuring of rivulets? Mæcenas was cured of continual

watchfulness by the falling of water ; and Pliny relates an anecdote of a Roman nobleman, who would recline upon a couch beneath one of his beech-trees, and be lulled to slumber by the falling of rain. Of a fine summer's evening, too, how delightful is it to pause upon the side of a hill which overlooks a favourite village, and listen to the various sounds which come softened by the distance !

If some sounds are beautiful, there are others, also, which assume the character of sublimity, and some which partake of the nature of both. Such are those gentle breathings of the wind after a storm, resembling the sounds produced by the combustion of hydrogen gas, and which Gray, with much felicity, compares to the tones of the Eolian harp, admitting of agreeable interruptions, like the cadences which divide one harmonic period from another. To such sounds Mason alludes in the following passage :

Can music's voice, can beauty's eye,
Can painting's glowing hand supply
A charm, so suited to my mind,
As blows this hollow gust of wind ?
As drops this little weeping rill,
Soft trickling down the moss-grown hill ?
While through the west, where sinks the crimson day,
Meek twilight slowly sails, and waves her banners gray.

The notes that are at intervals heard from animals and birds are equally pleasing to the soul. "The wild dove," says an Arabian poet, "sooths me with her notes ; like me, she has a dejected heart."

Of sounds which partake of a sublime character, what can be more truly so than that of the falling of cataracts, than the rolling of thunder, the roaring of the woods at midnight, from which, Lucretius says, man first taught himself music ; than the shrieks and cries of marine birds during a storm, or the deep howlings of the tempest itself, occasionally subsiding into a general hush ; and those analogous sounds,

with little or no definite character, which Ossian calls the "spirit of the mountains," and to which Virgil alludes in his fifth Bucolic :

Sounds that make
Succeeding silence still more awful !

In Fingal's Cave, in Staffa, among the Highlands, there is a cavity below the water, which at every flux and reflux of the tide sends forth a melodious murmur, on which account the peasantry call it by a name signifying "the Cave of Music."

The intermittent sounds, too, which are heard among the clefts of desolate rocks, are equally pleasing to those who derive gratification from whatever is wild, grand, and magnificent. Nothing can be more productive of sublime emotion than the roar of the ocean against the rocks of St. Kilda, the pillars of Fingal, or the perpendicular cliffs of Penmaenmawr: sounds heard with equal effect near the chapel of St. Mildred, where the rocks form themselves into immense rampires, and where, amid the dashing of its waves, the sea appears as if it were captivated by the music of its own roar.*

The fine semicircle in which this chapel is situated appears in some measure to resemble the bay of the sea, encompassed on three sides with steep and gigantic rocks, called by the Swedes Odin's Hall. In the times of Gothic barbarism, as we are informed by a celebrated Swiss philosopher, men "who were either sick of diseases esteemed mortal or incurable, or had grown infirm with age and were past all military action, fearing to die meanly and basely, as they esteemed it, in their beds, usu-

* Ezekiel seems to have had a transcendent idea of the music of waters. "*The glory of the God of Israel came from the east, and his voice was like the noise of many waters; while the earth shone with his glory.*" In his vision of the glory of God, the movements of the cherubim are again likened to the sound of waters, and in the Apocalypse there are several similar passages.

ually caused themselves to be brought to the nearest of these rocks, whence they precipitated themselves into the sea; hoping, by the boldness of such violent death, to renew their claim to admission into the Hall of Odin, which they had lost by failing to die in combat or by arms."

There is a whirlpool near the Isle of Jura, on the west coast of Scotland, which may be heard at a great distance, resembling the sound of a multitude of chariots. "On the shores of Argyleshire," says Campbell, "I have often listened with delight to the sound of this vortex, which creates a fine and magnificent effect." During storms on Mount Bogdo, a distant murmuring is heard as of many hundred voices joining in prayer. The Calmucs have many fables attached to this mountain in consequence, and they esteem it the abode of saints, who are engaged in singing spiritual songs.

Sounds like these, heard among the lonely recesses of the Highlands, or on the shores of the Adriatic and Ionian Seas, have the effect of rendering the inhabitants peculiarly alive to the errors of superstition.* Every one has read of the effect which the sirens are reported to have had on seamen voyaging near Cape Pelorus, in the Island of Sicily, no one having been able to withstand their vocal charms but Orpheus and Ulysses. The painters represented

* "The singular connexion of causes and effects makes superstition less to be wondered at, particularly among the ignorant; and when two facts, naturally unconnected, have been accidentally coincident, it is not singular that this coincidence should have been observed and registered, and that omens of the most absurd kind should be trusted in. In the west of England, half a century ago, a particular hollow noise on the seacoast was referred to a spirit or goblin called Bucca, and was supposed to foretel a shipwreck: the philosopher knows that sound travels much faster than currents in the air—and the sound always foretold the approach of a very heavy storm, which seldom takes place on that wild and rocky coast without a shipwreck on some part of its extensive shores, surrounded by the Atlantic."—*Davy*.

one of them as singing, the second playing on the flute, and the third on the lyre. Claudian says that they inhabited harmonious rocks; that the sailors lost all desire of saving their vessels, were wrecked without regret, and expired in raptures.*

ECHOES.

So singular and agreeable are the sounds of an echo, especially by night, that it is no subject for wonder that the ancients, who embellished everything, should have touched that pleasing and mysterious phenomenon with the wand of allegory. Echo, says the poet, was the daughter of the air and the earth. She was one of the attendants of Juno, but, having displeased her imperious mistress, she was deprived of language, and the power of giving a response alone allowed to her. Roving afterward among the woods, she beheld Narcissus, and loved him. Some of the poets relate the story in a different manner, and even change the character of sex. Hylas, says Theocritus, one day going for water to quench the thirst of Hercules, the Naiads beheld him from the opposite bank, and, at the moment he was filling his vase, bore him away. Hercules wandered about the hills and forests in quest of him, and made each rock and valley resound with his name; when the Naiads, fearing that he would discover him in their fountain, changed him into an echo.

The poets, as well as the mythologists, have made a charming use of this mysterious nymph; for, in spite of Theocritus, I am unwilling to believe that Echo could be masculine. Bion, in his poem on

* Rollin considers this story of the sirens as an allegory; indicating that there are pleasures which, though they may seem to be innocent, are in the highest degree dangerous.

the death of Adonis, introduces her in a passage which has been imitated and amplified by Camoëns. Moschus, too, in his Idyl on the death of his friend, beautifully represents Echo, on the death of Bion, as roving among the rocks, still listening to catch the last murmuring of his notes, and, since she listened in vain, becoming melancholy and silent.

Echoes reside, for the most, in ruined abbeys, in caverns, and in grottoes ; they reverberate among rocks, mountains, and icebergs ; in the areas of antique halls, in the windings of long passages, and in the melancholy aisles of arched cathedrals. There is an ancient portico, near the temple of Clymenos, in the district of Cthonia, which repeats three times. In the sepulchre of Metella, the wife of Crassus, an echo repeated five different times in as many different keys ; and Barthius relates that on the banks of the Naha, between Bingen and Coblentz, an echo repeated seventeen times. Though the person speaking or singing could scarcely be heard, the responses were loud and distinct, clear and various ; sometimes appearing to approach, at other times to come from a great distance, and much after the manner of an Eolian harp.

In the cemetery of the Abercorn family, at Paisley, in the county of Renfrew, there is an echo exceedingly beautiful and romantic. When the door of the chapel is closed with any degree of violence, the reverberations are as loud as peals of thunder. Breathe a single note in music, and the tone ascends gradually, with a multitude of echoes, till it dies in soft and bewitching murmurs. If the effect of one instrument is delightful, that of several in concert is indescribably captivating, exciting the most tumultuous and rapturous sensations. In this chapel, lulled by ethereal echoes, sleeps Margery, the daughter of Bruce, the wife of Wallace, and mother of Robert, king of Scotland.

Echoes multiplied every sound in the Grotto of

Delphi, adding to the veneration which prompted such multitudes to visit the temple of Apollo, the splendour of which in marble and in statues of gold and silver, was for many ages unequalled in Greece.

There is an echo on the estate of the Marquis of Simonelta, near Milan, which reiterates the last syllable fifty-six times: Misson states a hundred times. It is described by Kircher and Bartholin. Montfaucon says that the report of a gun is repeated so as to be heard like the running fire of a company of soldiers; and another traveller relates, that "any single musical instrument, well touched, will have the same effect as a great number of instruments, and produce a most delightful concert."

In the garden of the Tuileries there was an artificial echo, which repeated a whole verse without the loss of a syllable; and the mausoleum of Cecilia, daughter of Metellus, is said to have repeated an entire verse of hexameter. But among the hermitages of Montserrat, particularly near that of Santissima Trinidad, the rocks return such perfect echoes that the birds are said to warble in answer to the reverberations of their own music.

The natives of Cuba, in the time of Columbus, thought that echoes were the responses made by the souls of their departed friends. Ossian calls Echo "the son of the rock." The Highlanders believed, and do so to the present day, that the repercussions of sound from a rock are the answers of a spirit residing in its bosom. Nothing can be more beautiful than Ossian's address to the echo in his battle of Lora; the allusion to his own misfortune, too, is highly natural and affecting: "Son of the distant land, who dwellest in the secret cell! do I hear the sound of the wind, or is it the voice of songs? But I heard a tuneful voice. Dost thou praise the chiefs of thy land, or the spirits of the wind? But, lonely dweller of rocks! look thou on that heathy plain. Thou seest green tombs, with their rank whistling

grass; with their stones' mossy heads. Thou seest them, son of the rock, but Ossian's eyes have failed!"

The Syrians styled Echo "the daughter of voice;" Euripides, "the child of the mountains;" Lucretius, who beautifully describes the scenes where Echo loves to dwell, calls her "the image of speech;" Shakspeare, "the babbling gossip of the air;" and Milton, speaking of her, says she shall give "resounding grace to all heaven's harmonies."

Vaillant relates that the Nimiguas of South Africa play upon an instrument resembling a flute, in such a manner as to produce melodious echoes. This is effected by the musician shifting the instrument from his mouth to his nostrils; when, continuing to blow as before, the wind that issues from the nostrils resembles an echo so exactly, that those who listen are equally surprised and delighted.

Struck with the pleasing effects of echo in the music of Nature, the poets, formed by her hand and guided by her teachings, were emulous to imitate her. Hence the origin of rhyme, and hence that species of verse among the Greek and Roman poets which was characterized by the repetition of the last syllable. The *echoicus* has been but little attempted by the English poets, but has been successfully cultivated by the Spanish.

To echoes are doubtless to be ascribed many of the prodigies related by the Roman historians. Rome, from being built on several hills, must have been particularly favourable to these reverberations of sound; and this may, in a great measure, account for the extraordinary noises that are reported to have been heard in the city at particular crises, and which were considered by that superstitious people as so many supernatural portents.

MUSIC OF THE SPHERES.

THE ethereal music of echoes naturally calls to mind Plato's idea in relation to the harmonious movements of the planets, which he terms the music of the spheres: a harmony resulting from the motions of the planets, and modulated by their relative distances and magnitudes. 'This idea is not only beautiful, but in all probability just.

Proclus carried the notion so far as to suppose that even the growth of plants is attended with sound. Every object that moves produces a greater or less vibration in the atmosphere. Observing this, Archytas, Pythagoras, and Plato conceived it to be impossible that bodies so large as the planets, and revolving in orbits so vast, should move without some audible repercussions; so that the heavens might be said to produce a concert, to which the gods themselves might delight in listening. "A melody," says Maximus Tyrius, "too transcendent for the frailty of man, and the excellence of which ethereal beings are alone capable of appreciating."

How beautifully does Shakspeare allude to this poetical thought, where Lorenzo leads Jessica into the grove, and, after desiring Stephano to order music to be brought into the garden, accosts her in the following manner:

"Soft stillness and the night
Become the touches of sweet harmony.
Sit, Jessica; look how the floor of heaven
Is thick inlaid with patterns of bright gold.
There's not the smallest orb which thou behold'st,
But in his motion like an angel sings,
Still quiring to the young-eyed cherubim.
Such harmony is in immortal souls;
But, while this muddy vesture of decay
Doth grossly close it in, we cannot hear it."

This idea is in some measure sanctioned by the Hebrew Scriptures: "the stars move in their course

rejoicing," "when the morning stars sang together," and other analogous expressions, would seem to allude to this celestial harmony. Servius says that the idea of this music originated with Orpheus, and that the Pythagoreans affirmed that their master was the only human being ever permitted to hear it. There is a passage in Euripides, where he exclaims, "Thee I invoke, thou self-created Being, who gave birth to Nature, and whom light and darkness, and the whole train of globes and planets, encircle with eternal music."

Fontenelle remarks, that it was believed in ancient times that the moon was the appointed residence for the souls of the good men of this earth, whose principal happiness consisted in listening to the music of the spheres.

LANGUAGE OF BIRDS.

OF all the feathered inhabitants of the forest or of the water, none cause so great astonishment, we are told, as the toll of the *campanero*. When all other birds are silent, the forest is still cheered by this bird. "You hear his toll," says Waterton, "and then there is a pause for a minute; then another toll, and then a pause again; and then a toll, and again a pause. Then he is silent for six or eight minutes, and then there is another toll, and so on. Orpheus himself would drop his lute to listen to him, so sweet, so novel and romantic, is the toll of the pretty snow-white *campanero*. He is never seen to feed with the other *cotingas*, nor is it known in what part of Guiana he makes his nest."

BIRDS possess so much of an imitative faculty, that they can be taught the language of men as well as the melodies of artificial music. Beasts have no such power; and yet they are not totally unsuscep-

tible of musical impressions, as has frequently been seen in cats, dogs, horses, elephants, and rattlesnakes. Without giving credit to the fables of Ælian or to the fancies of Schotteus, many stories are related of the susceptibility of animals to the charms of melody, which are attested by credible witnesses, and recorded by writers of indubitable authority.

The voices of birds may be divided into croaking, chattering, clucking, screaming, and singing. The note of the raven is hoarse and disagreeable, yet it may be taught to speak and to sing after the manner of men. The magpie, which has a natural chattering, may be instructed in the same manner; also the starling, the natural language of which is harsh and rather discordant. The cry of the owl is solemn, and calls to courtship; such, too, is the object of the cuckoo, when, in a style agreeable and mellow, yet monotonous, it announces the return of spring. The cooing of turtles is exceedingly soft, and the tears they are reported to shed endear them to our best affections. The plover allures the dog and his master from her nest. Flying from it, she endeavours to draw them away by her cries and wailings. When near it, she ceases to cry, overcome with fear, or endeavouring to deceive them by her apparent indifference.

As the smallest insects have the greatest strength in proportion to their size, so birds have a louder voice, compared with their dimensions, than any other species of animal. The voice of the Brazilian *anhima* is exceedingly loud, while the cry of the cock of the wood, which has been compared to an explosion, is succeeded by a noise like the whetting of scythes.

The cries of marine birds on a summer's evening, heard from a bold and rocky coast, are peculiarly striking. Swelling upon the breeze, the higher notes of the gull, the tenor of the auk, and the bass of the cormorant, united to the murmur of the

ocean, echoed from the rocks beneath, form one of the most curious and solemn concerts in nature.

The Brazilian paroquet is one of the most beautiful and loquacious of birds ; the bluebird of the Alps not only sings delightfully, but whistles and speaks, while the mocking-bird of America has the faculty of imitating every sound, whether of bird or of beast, in its neighbourhood. We are told that it will allure the thrush or any other bird with the note of its mate, and that when it comes near, it will frighten it with the scream of the eagle. Its natural notes are rich, soft, and various, and not unfrequently characterized by an agreeable solemnity.

No language appears to be so indicative of truth as that of birds. It appears, indeed, impossible that they should speak anything but truth. What lover of music but is charmed with the various modulations of our own singing-birds ? with the sweetness of the throstle ; the cheerfulness of the skylark ; the mellowness of the thrush ; the imitative talent of the bulfinch ; the varied and familiar language of the redbreast, endeared to us from childhood by so many agreeable associations ; that of the woodlark, priding herself in being little inferior to the nightingale, and building her home under large tufts of grass to shelter her from the cold ; the vivacity of the wren, forming her nest with dry leaves and moss, among hedges and shrubs, encircled with ivy ; and the soft note of the linnet, building upon heaths with roots, and among thorns with moss, and subject to the disorder of melancholy ? Not one of these birds breathes a note that is not listened to with pleasure.

“ Happy commoners !

That haunt in woods, in meads, in flowery gardens,
Rife the sweets, and taste the choicest fruits,
Yet scorn to ask the lordly owner's leave.”

But what bird, lute, or harp shall we compare with the nightingale of Europe and of Asia ? the

favourite bird of Sophocles and Tasso, and the subject of many an Arabic and Persian allegory. Pliny has described the effect of this bird's note with appropriate warmth, and Walton, a writer of genuine feeling and simplicity, has celebrated it in the truest measure of applause: "He that at midnight, when the labourer sleeps securely, should hear, as I have heard, the clear air, the sweet descant, the rising and falling, the doubling and redoubling of her voice, might well be lifted above the earth, and say, '*Lord! what music hast thou provided for thy saints in heaven, when thou affordest bad men such music upon earth?*'"

The practice of imitating birds is very common in Persia. Sir William Jones says that an intelligent person told him "he had more than once been present where a lutanist was playing to a large company in a grove near Schiraz, when he distinctly saw the nightingales trying to vie with the musician; sometimes warbling on the trees; sometimes fluttering from branch to branch, as if they wished to approach the instrument; and at length dropping on the ground in a kind of ecstasy, from which they were soon raised by a change of the mood." Alexander was once much importuned to hear a person who was capable of imitating the nightingale with no common excellence: "I would do so," he replied, "if I could not enjoy the superior happiness of hearing the nightingale herself!"

Poets in all ages have represented this bird as a melancholy one; and to this no one has a more agreeable allusion than Milton:

Sweet bird, that shunn'st the noise of folly,
Most musical, most melancholy,
Thee, chantress, oft the woods among
I woo to hear thy evening song.

The nightingale is in fact, however, a cheerful bird. She sings by day as well as by night, and is, as Martial calls her, the "most garrulous" of birds. Her notes, strong and sonorous, wild and mellow,

are in the highest degree enlivening when heard at highest noon, and only pensive and melancholy when all nature is hushed in silence, and our feelings lulled to repose. It is thus from association that she chiefly derives her power of disposing the heart to melancholy impressions: cheerful and happy herself, it is only as aided by the gloom and silence of night that she elicits tears from those who listen to her warblings.

The American mocking-bird has greater variety of note than any other bird. Capable of every modulation, in his imitations he is minute in measure and accent, but in force and sweetness of expression far superior to his originals. He will scream like an eagle; whistle for a dog; bark; mew; crow; cluck; squeak; and scream like a swallow. But his natural notes are far more delightful than his assumed ones. They resemble, in no slight degree, those of the nightingale, but are of greater compass and volume.

Man excels all animals in the various combination of the senses, but birds have a quicker sight. Their language, too, next to the melody of woman, is the most touching of all the melodies of nature. This arises not from the music itself so much as from the various associations with which it is connected. Hence the music of birds has always been delightful to the inhabitants of towns and cities; and hence the charm it has ever produced on the imagination of poets. Birds, too, seem to have a similar regard for man, for those of exquisite song are seldom found in solitudes to which he is a stranger

FLOWERS.

“BUT Nature’s engagements are engagements which throw no gold into the purse, nor will they

gain supporters for my escutcheon!" Thus says the man of the world. When we see a violet hiding itself under a bramble, a heliotrope courting the rays of the sun, or a *Fuschia* hanging its vermilion petals with its winding-sheet of purple; when we behold the bee, so tenacious of her mysteries that, from the first morning of the animal creation, she still preserves her secrets; when we listen to the jug, the pause, and the warble of the nightingale; when we behold the unrivalled splendour of the diamond beetle, the majestic coquetry of the swan, or the graceful pride and majesty of the stag, do we admire and wonder only? Or do we lift our thoughts to Heaven, and adore with silent admiration the omnipotent hand that formed them? And shall mere men of the world—But why waste a word upon them? The wonder is, that Nature should have fashioned beings so ungrateful for her bounties and so insensible to her charms.

Milton, alive to all the graces of the material world, finely describes the transports of our first parent, when newly created, at the sight of the beauties which adorned the Garden of Eden. Buffon has a similar description; and it forms one of the most eloquent passages of that celebrated naturalist. In Milton's fourth book, nothing can be more admirable than the general picture of the scenery which composed this terrestrial paradise; and in another part, in what glowing language does Adam exhort Eve to awake to the enjoyment of her flowers and shrubs:

Awake! the morning shines, and the fresh field
Calls us: we lose the prime to mark how spring
Our tender plants; how blows the citron grove;
What drops the myrrh; and what the balmy reed;
How nature paints her colours; how the bee
Sits on the bloom, extracting liquid sweet.

Floral Associations.—Delightful are the associations which the flowery world presents to the imagination of the poet and the moralist. Who can

forget the beautiful instance in the Gospel of St. Luke! "Consider the lilies,* how they grow: they toil not, neither do they spin; and yet, I say unto you, that Solomon in all his glory was not arrayed like one of these."

And here I am reminded of the poet Burns. "I have some favourite flowers in spring," says that extraordinary genius, in a letter to a friend, "among which are the mountain daisy, harebell, and fox-glove; the wild briar-rose and budding birch, and the hoary hawthorn, that I view and hang over with peculiar delight. I never hear the loud, solitary whistle of the curlew in a summer's noon, or the wild mixing cadence of a troop of gray plover in an autumnal morning, without feeling an elevation of soul like the enthusiasm of devotion or poetry. Tell me, my dear friend, to what can this be owing? Are we a piece of machinery, which, like the Eolian harp, is passive, and takes the impression of the passing accident? Or do these workings argue something within us above the trodden clod? I own myself partial to such proofs of those material and immortal realities: a God that makes all things, man's immaterial and immortal nature, and a world of weal or wo beyond death and the grave."

From this association it is that all collections of poems were anciently called Anthologies. The "flower of the flock," too, has been a proverbial expression in all ages. The Emperor of China assumes the titles of the "Flower of Courtesy;" the "Nutmeg of Consolation;" and the "Rose of Delight." In some parts of his empire, a virgin, when

* I am inclined to think that the word *lily* should be *tulip*. The lily, however beautiful, cannot be considered a splendid flower, but the tulip may. Besides, crimson was the royal colour, and the wild tulip is always crimson: and that that flower grows in abundance round about Jerusalem has been noted by several modern travellers. The first hint of this occurs in Gerard's *Herbal*, p. 137, fol. 1633

she has attained to marriageable age, decorates the window of her apartment with flowers. The Afghans employ them as tokens, by which friends living at a distance may convey verbal messages to each other. A servant sent on such a mission will thus begin: "If you and my master were sitting by yourselves in a garden, and he told you that he had counted thirty-four different kinds of flowers within a few yards on the hills of Caubul, that is to be a sign to you that what I say comes from him." The tales of the East have frequent allusions to the intercourse carried on by the interchange of fruits, buds, flowers, spices, leaves, and petals; and Davies describes a similar custom among the ancient Britons.

In Solomon's pastoral, floral allegories are perpetual:

"Whither is my beloved gone, thou fairest among women? Whither is thy beloved turned aside, that we may seek him with thee? My beloved is gone to the beds of spices; to feed in the gardens; and to gather lilies."

"I went into the garden of nuts; to see the fruits of the valley; and to see whether the vine flourished, and the pomegranate budded."

The anemone blends its colours so harmoniously, that it is difficult to discover where one tint begins and another ends; the anemone may, therefore, be compared to deceit. But the tulip, changing its colours so abruptly that the different shades may easily be distinguished, might be called the flower of openness and honesty.

National badges are frequently derived from flowers: thus that of England is the rose; France has adopted the lily, Ireland the shamrock, and Scotland the thistle.

Horace has many allusions to the shortness of life, and the similar picture that flowers present. In the *Winter's Tale*, Perdita suits the flowers she dis-

tributes to the ages of those to whom she presents them. To old men she gives rue and rosemary, which keep all the winter; to those of middle age she offers flowers of summer, such as lavender, mint, marjoram, and marigold; and to the young, oxlips, crown imperials, primroses, lilies, flowers-de-luce, daffodils, and violets. Horace compares youth to ivy and myrtle, and old age to dried leaves.

Boccalini has a story that ambassadors from all the gardeners in the world were sent to Apollo at Parnassus, to request him to grant them an instrument for the more effectual weeding of their gardens, which had become of late so full of henbane and other noxious plants, that the expense of keeping them clean absorbed all their profits. Finding no very great attention paid to their suit, they pressed it by reminding Apollo that he had granted drums and trumpets to princes, at the sound of which all the useless weeds of society were extirpated. They entreated him, therefore, to give them instruments which would have a similar effect in their gardens. "If princes," returned the god, "could as easily discern the weeds of society as you can discern the weeds in your gardens, I should have given them only halters and axes for their instruments. But, since all men are made of the same materials, it is impossible among them to know the weeds from the flowers, as you can do; and therefore I cannot but esteem you not a little ridiculous in comparing the purging of the world from seditious spirits to the drawing of weeds out of a garden."

Floral Ornaments.—The designs that flowers have afforded to painting, sculpture, and architecture, with their effects upon the mind, are beautifully touched upon by the author of the "Spectacle de la Nature." In the manufacture of silks, as well as in the fine arts, flowers are adopted as giving the greatest variety, and the most vivid expression to a shawl, a robe, or a mantle. The practice is of great an-

tiquity. Equally so is the custom of presenting silk ornaments, in which the flowers are interwoven or embroidered, to friends and persons of high consequence and rank. It prevailed in ancient Syria and Persia, and is still observed in India, Turkey, and Ethiopia. The passage in the *Æneid*, where Andromache presents to Ascanius a robe wrought with flowers of golden tissue, and requests him to accept it as a friendly gift from the wife of Hector to a youth in whom appeared the charms and graces of her lost Astyanax, is exceedingly beautiful.

Flowers are inwoven in the shawls of Cashmere ; and the Chinese embroider all their works with the flowers and foliage of the shrub called Hai-Tang, much celebrated by their poets. The practice is imitated in the Gobelin tapestry and the Dresden china ; and when Mons. de Boisgelin was in Denmark, a service of porcelain was preparing, on which were delineated all the plants of the *Flora Botanica*, classed and arranged according to the system of Linnæus.

Floral Honours.—In distributing rewards and in conferring honours, Nature is generally appealed to. Poets were crowned with bays, and conquerors with laurel ; and of the ten kinds of bearings into which the art of heraldry is divided, seven consist of signs drawn from the natural world. When we would welcome a hero or a monarch, boughs are scattered in his path ; and many of our ancient festivals were celebrated under an oak, the young women with nosegays in their hands, and the young men with oak-leaves in their hats.

In Salency, a small village in Picardy, there still remains an interesting custom. It is called "the festival of the rose." On a certain day of every year the young women of the village assemble. After a solemn trial before competent judges, that young woman who is found to have conducted herself the most discreetly, and gives the strongest

proofs of the general innocence and simplicity of her character, is decorated with a crown, which thenceforward becomes an object of pride to her whole family. This crown consists of a hat ornamented with roses. It frequently constitutes the whole wealth of the wearer; but instances are far from being unfrequent in which it has been esteemed the most honourable recommendation to a wealthy suiter. This festival was instituted by St. Medard, in the fifteenth century. He was the sole proprietor of the village, and his sister the fortunate winner of the first prize. To the time of the revolution this custom was observed with all the preparation and solemnity that marked its primary institution three centuries before.

Flowers on Graves.—The Romans of rank were generally buried in their gardens or fields, near the public road. This custom Propertius seems not to have approved; since he desires his friends by no means to observe it in regard to himself, lest his shade should be disturbed by the noise of passengers; and Ausonius has a similar sentiment. The manner in which the Romans took leave of their dying friends was exceedingly affecting: "*Vale, vale, vale! nos te ordine quo natura permiserit—cuncti sequemur.*"—Farewell, farewell, farewell! in the order which nature permits, we shall all follow thee." Then, praying that the earth might lie lightly on their remains, they departed. Their monuments were afterward decorated with chaplets of the balsam-tree and garlands of flowers.

A similar practice prevailed in most ancient countries. The Persians adopted it from the Medes, the Greeks from the Persians, and Pythagoras introduced it into Italy. The tomb of Achilles was decorated with amaranth; the urn of Philopœmen with chaplets; and that the grave of Sophocles was embellished with roses and ivy, we learn from an epitaph written by Simonides.

Virgil strews on the body of Pallas leaves of the arbutus and other funeral evergreens. The ceremony of laying the unfortunate youth upon his bier is extremely affecting; and the passage where he is compared to violets and hyacinths plucked by virgin hands, highly beautiful and pathetic.

The body on this rural hearse is borne :
 Strew'd leaves and fun'ral greens the bier adorn ;
 All pale he lies, and looks a lovely flower,
 New cropp'd by virgin hands, to dress the bower.

To this we may add, that few passages in that fine poem abound more in natural pathos than that where Andromache is represented as raising green altars to the memory of Hector; a passage reminding us of several in Ossian, where the poet describes the monuments erected to the heroes of remote ages: "O lay me, ye that see the light, near some rock of my hills; let the rustling oak be near; green be the place of my rest, and let the sound of the distant torrent be heard."

In the times of the ancient fathers, crowns of flowers were placed on the gravestones of virgins, and baskets of lilies, violets, and roses on the graves of husbands and wives.

The burying-places of the people of Morocco are generally situated in the fields, where every one purchases a spot of ground, which he surrounds with a walk and plants with flowers. In Java they scatter a profusion of flowers over the bodies of their friends, and the Afghans hang coronets and burn incense on their tombs, while the ghosts of the deceased are believed to sit at the head of their graves, invisible, enjoying the perfume.

In China, whence it is not improbable the custom originally passed into Media, Persia, and Arabia, the ceremony of planting flowers on graves still prevails. The mausoleums of the Crimean Khans, also, are generally shaded by shrubs and fruit-trees; and the

Indians of Surat, who have a great veneration for the graves of their saints, strew fresh flowers on them every year.

In Scotland this practice prevailed in the time of Drummond of Hawthornden, as well as among the Catholic cantons of Switzerland,* and in many parts of North and South Wales. The graves in those beautiful provinces are decorated on Palm Sunday with leaves of laurel and cypress, and with all the flowers in bloom at that early season of the year. These graves are surrounded by small whitewashed† stones, in the enclosures of which blossom the polyanthus and narcissus, thyme, balm, and rose-

* In the beautiful little churchyard at Schwytz almost every grave is covered with pinks; but on no one of the many charming spots appropriated to burial-grounds in Germany and Switzerland is there so much care bestowed as on that of the churchyard of Wirfin, in the valley of the Salza. The usual fashion in Germany and in Switzerland is to have the sepulchral ornaments of wood or iron wrought in arabesque forms. At Wirfin the graves are covered with little oblong boxes, which are either planted with perennial shrubs or with annual flowers; and, in addition, some graves are daily strewed over with freshly-gathered flowers, while others are so on fête-days. Pendent from the ornaments of most of the recent graves there are also little vases filled with water, in which the flowers are preserved fresh. Children are seen thus decking the grave of a lost mother, and mothers wreathing garlands to hang on that of a child. Again, servants show in the same way their gratitude and regret for the loss of some kind master or mistress. A tourist, who recently visited the little village of Wirfin, says that, on going into the churchyard at an early hour, he found there six or seven persons employed in these gentle offices. He informs us that the graves most recently tenanted were not alone the objects of this affectionate tribute, but that some which had received their occupant twenty years before were covered with fresh bouquets.—*Anon.*

† The Jews used to paint their sepulchres white; and to this Christ alludes in his terrible denunciation against the Scribes and Pharisees: "Wo unto you, Scribes and Pharisees, hypocrites! for ye are like unto whited sepulchres, which indeed appear beautiful outward, but are within full of dead men's bones and of all uncleanness."

mary. Shakspeare alludes to this custom in *Hamlet* and in his *Winter's Tale*; also in *Cymbeline*, where *Arviragus*, contemplating the body of *Fidele*, promises to sweeten his grave with the fairest flowers of summer.

It is impossible, indeed, to walk in the churchyards of North and South Wales without being deeply affected by the respect paid to the memory of the dead.

In some villages, children have snowdrops, prim-roses, violets, hazel-bloom, and sallow blossoms on their graves: persons of maturer years have tansy, box, ivy, and rue. There is generally a guardian, as it were, to each grave; and I once saw a rose, done up neatly in a white piece of paper, on which was written, "Mayest thou flourish in Paradise like this rose!"*

* "It is usual to strew the graves in South Wales with flowers and evergreens (within the church as well as out of it) thrice at least every year, on the same principle of delicate respect as the stones are whitened. No flowers or evergreens are permitted to be planted on graves but such as are sweet-scented: the pink and polyanthus, sweet-williams, gilliflowers, and carnations, mignonette, thyme, hyssop, chamomile, and rosemary, make up the pious decoration of this consecrated garden. The white rose is always planted on a virgin's tomb. The red rose is appropriated to the grave of any person distinguished for goodness, and especially benevolence of character. In the Easter week, most generally, the graves are newly dressed and manured with fresh earth, when such flowers as may be wanted or wished for are planted. In the Whitsuntide holydays, or, rather, the preceding week, the graves are again looked after, weeded, and otherwise dressed, or, if necessary, planted again. This work the nearest relations of the deceased always do with their own hands, and never by servants or hired persons. Should a neighbour assist, he or she never takes, never expects, and, indeed, is never insulted by the offer of any reward by those who are acquainted with the ancient customs. None ever molest the flowers that grow on graves, for it is deemed a kind of sacrilege to do so. A relation or friend will occasionally take a pink, if it can be spared, or a sprig of thyme from the grave of a beloved or respected person, to wear it in remembrance: but they never take much, lest they should deface the growth on

That the custom of which we are speaking was prevalent in Normandy, the following anecdote sufficiently testifies. A lady of that province having deserved well of her friends, they intended to bury her in the chancery of Rheims. But the poor of her village petitioned that she might be interred among them, that they might every year assemble near her tomb, strew flowers upon it, and commemorate her virtues in the best manner they could.

In Swedish Lapland juniper leaves are placed in coffins, and in Denmark ivy and laurel. The natives of the South Seas plant *casuarina* near their sepulchres; and the slaves in the Isle of France bury their comrades in bamboo, covered with palm leaves. Every description of flower is employed in the burial-places of Japan. Thither the Japanese repair on parties of pleasure, to enjoy themselves among the tombs of their ancestors. For some time they go every day, then every week, then every month, and, lastly, once in every year. They imagine their deceased friends to be sensible of their happiness; they invite them to be partakers of it, and place seats for their accommodation, as if they were still alive.

The natives of Caubul, too, hold their burial-grounds in great veneration. They call them "Cities of the Silent," as the Egyptians called theirs "Cities of the Dead," and the Jews "Houses of the Living." In the time of Confucius, the Chinese buried the images of their friends in the graves of the deceased; those settled in the Malay Islands sleep upon the lids of their coffins, which they keep by them, carved and ornamented. The Egyptians visited the sepulchres of their friends twice every week, and strewed upon them sweet basil: a custom which still remains.

The Congoese bury their friends in graves of great the grave. This custom prevails principally in the most retired villages."—*Anon.*

depth, to preserve them from wild animals; plant trees and shrubs, and hang fetiches or charms over them. On the Ivory and Grain Coast of Africa, the natives put their dead into an empty canoe, which they fill with all sorts of green plants. On the Gold Coast they cover their deceased friends with little gardens of rice. In Siam they burn the bodies of the dead on a funeral pile of odoriferous woods. The Javans plant *samboja* trees by the side of graves, and strew *sulasi* flowers over them several times every year. These flowers have a sweet scent, and are reared exclusively for that purpose. They also form an image of leaves, ornamented with variegated flowers, in the human form, supported by the clothes of the deceased. Before this figure they place a pot of incense; after which they burn garlands, and the friends sit down to a feast, invoking a blessing on themselves, their houses, and their lands.

In a village in the Peak of Derbyshire there is a custom of suspending garlands of white roses, made of paper, over the pews of those unmarried villagers who die in the flower of their age.*

* "In Glamorganshire, we are told, the bed whereon the corpse lies is covered with flowers, a custom alluded to in one of the wild and plaintive ditties of Ophelia:

White his shroud as the mountain snow,
Larded all with sweet flowers;
Which be-wept the grave did go,
With true love showera.

There is also a most delicate and beautiful rite observed in some of the remote villages at the south, at the funeral of a female who has died young and unmarried. A chaplet of *white flowers* is borne before the corpse by a young girl nearest in age, size, and resemblance, and is afterward hung up in the church over the accustomed seat of the deceased. These chaplets are sometimes made of white paper, in imitation of flowers, and inside of them is generally a pair of white gloves. They are intended as emblems of the purity of the deceased, and of the crown of glory which she has received in heaven."—*Anon.*

VEGETABLE MIGRATION.

MANY vegetables are so attached to particular climates and soils, that, if transplanted without peculiar attention to their relative economy, they die. In this they associate with certain animals. But when they have once become habituated to the change, both plants and animals improve under the care and industry of man, sometimes even more than under the influence of their native soil or climate. How much cultivation will effect is evident from the circumstance, that in a field belonging to Mr. Oakley, of Halsford, near Ludlow, a pea produced 105 pods; and a grain of oats having accidentally fallen on a quantity of burned clay in a field, the property of Mr. Juckes, of Cocknage, produced 10 stems, and the astonishing number of 2345 grains.

Mr. Martell of Southsea, Hants, cut a cucumber 5 feet in length; and a currant was grown in Cambridgeshire, the fruit of which was so large that a single berry weighed 61 grains. and measured two inches and a half. The Honourable F. G. Howard had a bunch of grapes weighing 15 pounds; and at Hampton Court Palace, a vine in a grapehouse produced in one year 2200 bunches of grapes, averaging one pound each. This wonderful produce reminds us of a tradition of St. John, recorded by Irenæus, where Christ is made to say, "The days shall come in which there shall be vines which shall have each 10,000 branches; and every of those branches shall have 10,000 lesser branches; and every of these 10,000 twigs; and every of these twigs 10,000 clusters of grapes; and every one of these grapes shall yield 275 gallons of wine."

The first patron of vegetable importation in Europe was Cosmo I. of Tuscany. The cork-tree, unknown in Italy in the time of Pliny, had previously been introduced from Barbary; but he imported a

multitude of exotics from America, Africa, and the Levant, and from his collection many of the botanic gardens of European princes were afterward enriched.

All the more valuable productions of the West Indies came originally from the East. The olive was known in the time of Moses around Mount Ararat; but now it is found in no country less distant than from three to four hundred miles. In ancient times this tree was dedicated to Minerva, because, producing oil of the best flavour, it was esteemed an act of wisdom to preserve it, not only for domestic use, but as a staple for exportation. In the time of Evander it was introduced into Italy. The Spaniards planted the olive in South America. They then interdicted its culture, but afterward rescinded the regulation.

M. D'Ogeron planted the cocoa in the French settlement of St. Domingo in 1656. This had increased in 1715 to 20,000, when they all perished. Being replanted, however, their number amounted in 1754 to 98,946. The sugarcane was found by the Crusaders near Tripoli, where it was cultivated with great care. It was afterward planted in Madeira, whence it was carried to the Brazils, where for some time it was used only as a medicine.

The only indigenous fruits at the Cape of Good Hope are the wild plum, the chestnut, and the wild almond. All others have been introduced at different times by different persons. The camphor-tree, from the East Indies; strawberries, from Holland; and vines, mulberries, and peaches, from France. The last of these fruits is indigenous in Japan. From Persia it migrated through Asia Minor to Rhodes, and in the time of Claudius it was first planted in Italy.

Hercules brought the orange into Spain; the Moors the pistachio, the banana, and many other tropical plants. Jussieu intrusted Deslieux in 1720

with a young coffee-tree, which he planted in Martinique, and that one plant became the parent of all those now in the West Indies. Monsieur Louis Dupoy, a colonist of St. Domingo, introduced seeds of the cotton-plant, and near Dax they came to maturity.

France furnished England with almost all her apples and pears, if not with vines. In the reign of Henry VII., apples were from one to two shillings apiece, and eight and sixpence were given for a few strawberries. In respect to pines, of those most known in Great Britain, the Scotch alone is indigenous. The common larch came from the Alps in 1629; the balm of Gilead from America in 1696; the Weymouth in 1705; and the frankincense in 1736. The Aleppo came from the Levant in 1732; the spruce from Norway; and the silver pine from the Alps in 1739; while the Jersey came from North America even so lately as 1748.

The best mode of introducing tropical plants into more temperate climates is to transplant them by degrees, so that the grandchild of an original plant may live and flourish where the mother would have languished and the grandmother have died. With this view the Marquis de Villanueva del Prado formed a botanical establishment at Teneriffe, in order to prepare the plants of Lower Africa, New-Holland, Mexico, and other tropical regions, for the cooler temperature of the south of Europe. Suit the plant to the soil rather than the soil to the plant, should be the motto of every husbandman; but the botanist must vary his methods as circumstances require.

An English gardener manages to have good fruit at St. Petersburg, notwithstanding the severity of the winter; and this he manages by training his trees so near the ground that during the whole winter they are covered with snow. Even the deserts of Africa might be gradually brought under the empire of man, were he to plant detached portions of

them with roots of the long creeping vegetables which are found here and there in those regions.

Some plants are common to equinoctial Asia, Africa, and America; others only to equinoctial America and Africa; some only to equinoctial Africa and India; some only to America and Asia; and others only to America and Africa; while others are equally common to Europe and New-Holland.

To account for these singularities would perhaps be an impossible labour; but it may present no unprofitable result to the imagination, if we collect and contrast a few of these remarkable phenomena. The lily-root, so common in Europe, is found in Newfoundland, on the Northwest Coast of America, and in Kamschatka, as well as in the warmer parts of Southern Asia. Heath, on the other hand, is not only unknown in the European latitudes of America, but throughout the whole of that continent; a circumstance the more remarkable, since it is common in the opposite peninsula of Kamschatka. The papyrus, scarcely known except in Egypt, in Sicily, on the Congo, and in Madagascar, has never taken root on the opposite coasts; and of the thirteen species of African palm, the *Alfonsia oleifera* is the only one that has yet been discovered in America. And here we may notice a very remarkable fact: the cusso-tree does not extend beyond the limits of a disorder which the leaves seem expressly intended to cure, viz., that arising from the worms to which the natives of Abyssinia are peculiarly subject.

The mountains of Spitzbergen, however barren they may appear in the distance, afford moss and other small plants, such as poppies, scurvy-grass, and ranunculi. The spurred violet, though not a native of Britain, is indigenous in Iceland and Switzerland; and yet Iceland plants are almost all British. In what manner could this violet have become indigenous in Iceland, when Britain, lying between the two countries, knows it only as a guest?

In Sweden grows the rare plant *cypripedium bulbosum*, which is a native of North America. It is seen in no part of Europe except near Kiemi, and to that town the professors of Upsal send for specimens. Near Christiana the *salix herbacea* grows; but so diminutively, that Dr. Clarke compressed twenty of them into two pages of a duodecimo volume. It is the smallest of trees.

How came ranunculi to grow on an island in the Polar Regions, at the mouth of Waygat's Strait, where there are no species of vegetation but moss, sorrel, and scurvy-grass? Whence does it arise that the paper-mulberry is found in the island of Lefooga, and in scarcely any other of the Pacific islands? Why is not the nutmeg, so abundant in the Malaccas, found in the other Indian Islands? Why is the tea-tree, which grows so luxuriantly in Java and its dependant islands to the east, denied to Sumatra and the peninsula of Malabar? And why is the *anana* of Hindústân, the flavour of which seems to be compounded of sugar, strawberries, claret, and rose-water, and therefore so peculiarly worthy of transplantation, almost entirely confined to that country?

The maize and the pineapple, the papaw and the tobacco of Africa, are said to have come originally from America, and the tamarind and sugarcane from Asia. But in what manner they were introduced no probable conjecture has been formed. The cinnamon, too, is very remarkable in its migrations. This tree is found in Ceylon, Malabar, Sumatra, Tonquin, Cochin-China, Caubul, Borneo, Timor, the Loo-choo Archipelago, Floris, Tobago, and the Philippine Islands. It grows also in the Isles of Bourbon and Mauritius; in the Brazils; the Sichelle Islands; Jamaica and Guadaloupe. In 1772 it was introduced from the Isle of France into Guiana, and since that time into the Antilles. Now it is not very difficult to account for the appearance of this tree in

so many longitudes ; since, besides what has been done by man, birds might carry its seed into some regions, and the tides float its roots or even its trunk to the shores of others.

European science has searched the civilized world ; but only a small portion of savage plants, if so they may be called, are yet known ; for even the numerous species growing in the New World, examined by Bonpland and Humboldt, form but a small portion of the vegetable wealth of that magnificent continent.

The coasts of New South Wales have yet been but superficially explored, and the interior still less ; but its vegetable wealth may in some measure be conceived from the circumstance that it affords even to a superficial survey twelve species of the *Pultenea*, fourteen of the *eucalyptus*, seventeen of the *hakea*, twenty-one of the *Banksia*, and thirty-one of the *melaleuca*. While the Cape of Good Hope affords not only forty-nine species of *aloe*, and fifty-five of the *oxalis*, but seventy-four of the *protea*, and not less than 304 species of heath.

In 1763 Linnæus reckoned 7500 species of plants ; in 1784, Murray, 9000 ; in 1806, Persoñ, 27,000 ; and in 1809 they were estimated at 44,000. In 1816, M. Decandolle supposed them to amount to 50,000 ; and as Spain, Dalmatia, Russia, Turkey, Brazil, the Northwest Coast of America, the centre of Africa, New-Holland, Thibet, China, Cochin-China, and other countries, have been but imperfectly examined, he supposes the number to exceed even 100,000.

Humboldt calculated the number of vegetables at 44,000 : viz., in Europe, 7000 : in Africa, 3000 ; in New-Holland and the South Sea Islands, 5000 ; in the temperate zone of Asia, 1500 ; in the torrid zone of Asia, 4500 : in the two temperate zones of America, 4000 ; and in the torrid zone of that continent, 13,000. Here are very curious results. In New-Holland, almost unpeopled, and the South Sea Isl-

ands, evidently of a comparatively recent formation, we find almost as many species of plants as there are in all Europe; more than in all Africa, and nearly as many as in all Asia. How strikingly do the celebrated lines of Gray recur to our imagination!

Full many a flower is born to blush unseen,
And waste its fragrance on the desert air.

Nor is the vast profusion of vegetable beings that receive life and sustenance in the torrid zone of America less extraordinary. We may extend our surprise, too, to the singular fact, that in Lapland there are so many species of rare plants, that when Linnæus visited that country he was struck with astonishment.

In Mexico there is a tree, the flower of which, before it has expanded, resembles the closed hand of a monkey; when unfolded, the open hand. From this circumstance it has derived its name of *chiranthodendron*. Not long since there existed only one specimen of this tree in the known world. It grows, and has flourished for many ages, in Toluca, a city of Mexico, where it is esteemed sacred, and whither persons travel from great distances to procure its flowers. This tree has been fully described by Larretqui, a Mexican physician, whose work, written in Spanish, has been translated into French by M. Lescallier. Previous to the year 1787 this was the only tree of its genus known to be in existence; but some botanists having visited Toluca in that year, they took slips from it, and planted them in the royal garden in Mexico, where one of them took root, and had grown in 1804 to the height of forty-five feet. Humboldt and his friend Bonpland visited the parent tree. They knew of no other besides except that in Mexico; though, from some indistinct accounts, they thought it probable it might exist in some of the distant provinces of that country.

CORALLINA.

THE greatness and wisdom of the universal Creator are as conspicuously observed in the smallest as in the most gigantic of his works. The CORALLINA, endowed, as some one has remarked, with sensation scarcely sufficient to distinguish them from plants, build up, from the bottom of unfathomable seas, solid structures that form innumerable shoals and islands in the vast Pacific.

These insects exhibit one of the greatest miracles in creation. They are among the feeblest and most imperfect of animated beings, and yet Nature avails herself of them to construct some of the most durable of her edifices. Of these creatures some resemble snails, and others are like small lobsters; while they are of various sizes and lengths, some being as fine as thread, and several feet long. But the most common are formed like stars, with arms from four to six inches in length, which they move about with great rapidity, as it is supposed, to catch their food. Some are sluggish, others exceedingly active; some are of a dark colour, others blue, and some of a bright yellow. Those of the Mediterranean are more frequently red, white, or vermilion. On the coast of Australasia,* where their numbers

* Captain Kotzebue, the Russian navigator, who visited these regions during his voyage of discovery (1815 and 1816), indulges in the following reflections upon these amazing works: "The spot on which I stood filled me with astonishment, and I adored in silent admiration the omnipotence of God, who had given even to these minute animals the power to construct such a work. My thoughts were confounded, when I considered the immense series of years that must elapse before such an island can rise from the fathomless abyss of the ocean and become visible on the surface. At a future period they will assume another shape; all the islands will join, and form a circular slip of earth, with a pond or lake in the middle; and this form will again change, as these animals continue building till they reach the surface, and then the water will one day vanish, and only

are prodigious, Captain Flinders saw them of all colours, glowing with vivid tints of every shade, and rivalling in beauty the most gorgeous flower-garden in Europe.

These insignificant insects nature has employed to form islands and to build submarine continents. .

Omnipotence wrought in them, with them, by them.
Hence, what Omnipotence alone could do,
Worms did.

I saw the living pile ascend,
The mausoleum of its architects,
Still dying upward as their labours closed :
Slime the material ; but the slime was turn'd
To adamant by their petrific touch.
Frail were their frames, ephemeral their lives,
Their masonry imperishable.—MONTGOMERY.

The substance of which the corallina forms its cell has not been ascertained, though possibly of its own calcareous secretions.

Coral ceases to grow when the worm that forms it is not exposed to the washing of the sea. Coral rocks, therefore, never exceed the highest tide : when the tide subsides they appear firm and compact, exceedingly hard and rugged ; but no sooner does the water return than these insects are observed peeping out of holes which were before invisible.*

one great island be visible. It is a strange feeling to walk about on a living island, where all below is actively at work. And to what corner of the earth can we penetrate where human beings are not already to be found ? In the remotest regions of the north, amid mountains of ice ; under the burning sun of the equator ; nay, even in the middle of the ocean, on islands which have been formed by animals, they are met with !"

* The coral islands of the Pacific rise from the 30th parallel of south latitude to the 30th of north latitude. " Of the rapidity with which the coral grows, we are not in possession of sufficient information on which to form a correct judgment. Osnaburg Island is supposed to have been only a reef of rocks when the *Matilda* was wrecked there in 1792 : it is now an island fourteen miles in length, and covered on one side with tall trees, and the lagoon in the centre is dotted with columns. The coral, therefore, has probably made a rapid growth since 1792, though Captain Beech-

The nature of corals and corallines was first discovered by Mr. Ellis. "Your discoveries," said Linnæus, in a letter from Upsal to that philosopher, "may be said to vie with those of Columbus: He found out America or a new India; you have laid open hitherto unknown Indies in the depths of the ocean."

Coral reefs stretch along the whole western coasts of Guinea and Madagascar; the eastern coast of Abyssinia, the Red Sea, the Mediterranean; the coasts of China, Japan, and Corea, and the Straits of Sunda; also the entire eastern coast of Australasia; and are found in almost every part of the Pacific, covering not only detached parts, but extending several thousand square leagues.

On these reefs the high tides gradually deposite sand, shells, pumice, pebbles, mud, seaweed, small pieces of coral, wood, &c. Elevated to the surface, birds begin to settle on them and deposite their exuvia; saline plants take root upon them, and tropical trees, vegetables, and seeds are washed upon them. In this manner islands are formed and become enriched with soil, so that in a few years they are clothed with the prurient vegetation of tropical climates. Man then takes possession, and nature has thus rewarded herself for her labours. But she

ey found two anchors of a ton weight each, and a kedge anchor, which he supposes belonged to the *Matilda*, upon the sunken reef of live coral, and around these anchors the coral had made no progress in growing, while some large shellfish, adhering to the same rock, were so overgrown with coral as to have only space enough left to open about an inch. It is probable, however, that the oxide proceeding from the anchors may have been prejudicial, as far as its effects extended, to the coral insect, and thus have prevented its growth. All navigators who have visited these seas state that no charts or maps are of any service after a few years, owing to the number of fresh rocks and reefs which are continually rising to the surface; and it is perfectly accordant with the instincts of animals to continue working *without intermission* until their labours are consummated or their lives are extinct."—*Anon.*

does not cease to extend her operations ; her work of marine creation still goes on ; and the time may one day come when the existence of the Pacific as an entire ocean will be esteemed as fabulous as the ancient Atlantis. Islands are increasing in number every year, in size every hour. They rise in archipelagoes, and archipelagoes, in future ages, may be united into continents.

BEES.

PLINY was a lover of bees, and his Natural History contains all that the ancients knew of their economy. Before his time there were only two practical writers on this subject: Aristarchus of Soli, who occupied himself entirely with the care of them, and Philiscus of Thasia, who lived all his life in forests for the purpose of observing their manners and gathering their honey.

There are many passages in the Scriptures alluding to this admirable insect. The sons of Jacob are described as taking to Joseph, their brother, a little balm and a little honey for a present ; and a curious and entertaining account of a trial of wisdom between Solomon and the Queen of Sheba, which was decided by a swarm of bees, is related in the Talmud.

Galen says that he had frequently seen honey upon trees and plants in parts of the country where no bees lived, and that the peasants in these cases called out, "Jupiter has rained honey." Some writers have confounded manna with dew ; but manna was a round substance falling upon the dew, and as small as hoar-frost. When the sun waxed hot, it melted ; its colour was like that of bdellium ; it resembled coriander seed ; and it had the taste of fresh oil ; but, if kept till the next day, it bred worms and stank. Grinding it in mills, the Israelites made cakes of it

and baked it in pans, and for forty years lived almost entirely upon it. St. Paul styles this food "spiritual meat;" David calls it "angel's food;" and Nehemiah and St. John give it the appellation of "bread from heaven."

Burckhardt says that the Bedouins collect manna on Mount Djebel-Serbal, under the same circumstances described by Moses. He states that when the rain has been abundant during the winter, it drops from the tamarisk-tree, common in the deserts of Syria and Arabia, and in the valley of Ghor, near the Red Sea; but he is not aware that this tree produces manna anywhere else.

Pliny mentions a mountain in Crete where bees were never found, and which, nevertheless, produced a considerable quantity of honey. It is probable, however, that both Galen and Pliny may allude to what is familiarly called honey-dew, which, in certain climates and under particular states of the atmosphere, may assume a consistence not observed in other countries. In particular seasons there appears a species of manna on the leaves of trees in California, this juice exuding from them like gum.

The culture of bees was in much repute in Attica, and fresh honey from the hive is still in great request at Athens. The fine quality of that produced on Mount Hymettus is derived from two species of savory. The peasants carry their bees in cane baskets up the hill in summer and back to the valleys in winter. They divide their hives in the spring, but do not permit the bees to swarm of themselves. Solon enacted a law that every man's stock should be kept at a distance of not less than 300 feet from that of his neighbour's; and that the penalty for poisoning a hive was extremely severe among the Romans, we learn from the result of a trial, in which Quintilian accused a rich man of poisoning a poor man's bees with certain venomous flowers that grew in his garden.

Ancient husbandmen frequently transported their bees from field to field for a more abundant supply of flowers, especially in autumn. The Greeks moved their hives every year from Achaia to Attica; and there is a wandering tribe, inhabiting the declivities of the Caucasus, who take their hives with them wherever they go; the natives of Juliers, in Westphalia, also change the locality of their bees according to the season. In some parts of France and Piedmont there are floating apiaries of a hundred hives; and similar republics once existed upon the Nile.

The honey of the Brazils is chiefly used as a medicine. The bees are small and black, and their sting comparatively painless. They deposite their wealth in the hollows of trees, which are frequently cut down for the sole purpose of getting the honey.

In Caubul bees are particularly attached to the sweet-scented yellow flowers of the *bedee mishk*. In the province of Pensa, in Russia, they fly with the utmost eagerness to the blossoms of the linden-tree, from which they form honey of a greenish colour and of a delicious flavour. But the flower which affords the richest liquid is the *nyctanthes* (Arabian jasmine). The Hindus believe that the bees sleep upon its blossoms during the night, to which Moore alludes when describing the sounds of falling waters :

“ Lulling as the song
Of Indian bees at sunset, when they throng
Around the fragrant Nilica, and deep
In its blue blossoms hum themselves to sleep.

The Guadaloupe bees deposite their honey in bladders of wax, about as large as a pigeon's egg, and not in combs. They have no stings, are small, and of a black colour, producing honey of an oily consistence, that never hardens. The bees of Guadalaxara, in the same manner, have no stings, and thence derive the name of *angelitos*, “ little angels.”

In Samar the hives hang in the form of oblong gourds from the branches of trees, and in South Africa they are suspended from the edges of rocks. These nests the Hottentots discover by following the flight of a little brown bird called the indicator, which, on finding one, flies in quest of some person to whom it may impart its secret, which it does by whistling and flying from anthill to anthill, till it arrives at the spot where the hive is. There it stops and is silent ! The Hottentot then takes the greater part of the honey, and the bird feasts upon the remainder.

The best honey in Persia is collected from the orange-groves of Kauzeroon, while that of Kir-cagah, near Pergamos, is the best in Anatolia, being obtained from the flower of the cotton plant that grows there : it is of a snowy-white colour. The white honey of Lebadæ is sent regularly to Constantinople, for the use of the grand seignior and the ladies of his seraglio.

Bees are very prolific in the Uralian Forest, but there are none in Siberia. The Scotch colonists at Karres, in the Caucasus, have upward of 500 hives. The honey here is said to have a fragrant smell and a most agreeable flavour. Its colour is a mixture of green and yellow. That of Guriel is nearly as hard as sugar, and partakes of that intoxicating quality to which Xenophon alludes in his History of the Retreat of the Ten Thousand. The same quality has been remarked in the honey of Paraguay, and in that produced on the borders of the Ganges. Some honey, as we learn from Wedelus's Dissertation on Nectar and Ambrosia, was called Ambrosia, while the "pure virgin" honey received the appellation of Nectar; and hence Linnæus called the repository in flowers the *nectarium*. The flavour of honey depends more on the kind of flowers on which the bees feed than on the insects themselves: Hence the fine flavour of the honey of

Deme, in the Tripolitan States, which is derived from the yellow blossoms of a plant that blows during the principal part of the year.

The uses of honey are various and important. The Susans were accustomed to comb their purple wool with it, to preserve its beauty and freshness. The Greeks had a drink, called *hydromel*, which consisted of water and honey boiled together, and in which was infused a little old wine. Among the ancient Britons, mead (*metheglin*) was the principal, if not the sole drink of luxury. In the court of Hoel Dha, the mead-maker took precedence of the physician. In Ireland they have a drink made of honey and mulberries, which they call *morat*.

The Spartans and Assyrians employed honey for preserving the dead from putrefaction. Hence the wish of Democritus that he might be buried in honey. The body of Alexander was embalmed in that liquid, after which it was placed in a coffin of gold enclosed in a sarcophagus.

Honey was frequently used by the ancients upon their altars, and in the ceremony of the Inferiæ it was poured upon the tombs of virgins. Iphigenia, in Euripides, promises to pour upon the funeral flame of Orestes,

“ The flower-drawn nectar of the mountain bee.”

In the Persians of *Æschylus*, too, Atopa prepares to pour, as libations over the tomb of his father,

“ Delicious milk, that foams
White from the sacred heifer; liquid honey,
Extract of flowers; and from its virgin fount
The running crystal.”

Hence honey was considered an emblem of death: notwithstanding which, it was supposed to be the principal food in the golden age of the poets. It was used, too, in the burnt-offerings of the Persians; but it was expressly forbidden by the Levitical law.

In medicine honey is esteemed a purgative and aperient, while it promotes expectoration and dissolves glutinous juices. The wax is employed externally in unguents, and internally in diarrhœas and dysenteries, combined with oily substances. In fact, honey was once so much esteemed that Horace frequently mixed it with his Falernian, declaring that, of all medicines for the stomach, this was the best. Epaminondas seldom took anything but bread and honey. The Bedas of Ceylon season their meat with it. Many of the disciples of Pythagoras lived almost entirely upon it; also the modern Tartars; and Augustus, one day inquiring of an old man, who had attained the age of a hundred, how he had arrived at so great an age, with a body so vigorous and a mind so sound, the veteran replied that it was "by oil without and honey within." The same is reported of Democritus.

The Romans considered bees, in general, as favourable omens; but if a swarm chanced to light on a temple, it was looked upon as indicative of some great misfortune. This is alluded to by Juvenal; and Livy records an instance, also, in which they were supposed to predict calamity.

The peasants of Wales, and, indeed, of most countries, are extremely cautious of offending their bees; believing, if they do so, that some ill fortune will attend them. Some have even gone so far as to imagine that bees possess a portion of the Divine mind: a belief so ancient that Virgil alludes to it. Others, however, have carried their superstition only to the length of allowing them a certain sacredness of character. Monarchs have respected them. Thus bees were wrought into the coronation robes of Charlemagne. Pope Urban VIII., too, chose three bees for his armorial bearings.

Bees have many enemies besides man. There is, among these, an animal inhabiting part of Africa, near the Cape, which, though endued with a body

which emits a nauseous effluvia, subsists principally on honey. It is called the *ratel*. The honey-guide cuckoo directs him to the hive of the bee, which being frequently in a part of the tree the ratel cannot reach, he signifies his rage by biting its roots and trunk; and this being observed by the Hottentots, they know by it that the tree contains honey. The hide of this animal is so tough that the sting of the bee cannot penetrate it.

Several persons have rendered themselves remarkable by their power over this little insect. The first account we have of this art occurs in Brue's Voyage. When that writer was at Senegal in 1698, he saw a man there who styled himself "the king of the bees." Nor was it without some reason that he did so; for he had acquired the art of attracting them to such perfection, that he could make them accompany him wherever he pleased, not only singly, but by thousands. The same art has been practised by several persons in England and in Germany.

In Warder's Monarchy is a curious account of the affection which the queen bee and her subjects have for each other. Reaumur gives a description of their architecture; while Smart, in his poem on the immensity of the Supreme Being, calls upon Vitruvius or Palladio to build, if they can, a cave for an ant, or a mansion for a bee.

A good hive contains a population of six thousand. Swammerdam gives the following account of a hive he had the curiosity to open. It contained 1 female, 33 males, 5635 working bees, 45 eggs, and 150 worms. To accommodate this population there were 3392 wax cells for the use of the working bees, 62 cells containing bee's bread, and 236 cells in which honey had been laid up: whole number of cells, 3690; population, 5864.

Bees bear an analogy to beavers, and to the genus in ornithology called *crotophaga*, which unite to

form one nest, and labour for the general benefit of the whole tribe. One species of the orchis bears a striking similitude, in point of external appearance, to our favourite insect, its flower having a spot in its breast resembling a bee sipping its honey. On this account it is called the bee-flower; and Langhorne thus alludes to it in his fables of Flora:

See on that flower's velvet breast,
How close the busy vagrant lies!
His thin-wrought plume, his downy breast,
Th' ambrosial gold that swells his thighs!
Perhaps his fragrant load may bind
His limbs: we'll set the captive free:
I sought the *living* bee to find,
And found the *picture* of a bee.

The astronomers have also imagined its shape in the heavens, and hence it has the honour of forming one of the southern constellations.

Bees are fabled to have distilled honey on the lips of Plato; and Pausanias relates that Pindar, on his way to Thesbia, fell asleep near the road, when bees flew to him as he lay, and dropped honey on his lips. The poets have ever been happy to avail themselves of the Apian republic to illustrate and embellish their subjects. Bees, therefore, are frequently important personages in the odes of Anacreon, the Idyls of Theocritus, and the poems of Moschus and Bion. The Indian poets compare them to the quiver of the god of love; and Euripides celebrates one of the valleys of Greece, because it was a haunt sacred to "the murmuring bees." The ancient fathers, particularly St. Augustine, drew frequently from them; and Milton gathers honey from the same source, one of his favourite amusements, before he was blind, having been to mark

How Nature paints her colours; how the bee
Sits on the bloom, extracting liquid sweet.

Howel compared the republic of Lucca, in 1621, to a hive; while Shakspeare, who left none of the

secrets of Nature unexplored, compares them, after the example of Virgil, to a free and well-directed government ; and in the Persian anthology there is an apologue, showing how the imperial Jamshid borrowed several of his institutions from them.

Pantænus called one of his friends " the Sicilian bee," because he selected sweets from various writers ;* Macrobius, in his preface to the Saturnalia, compares himself to the insect which imbibes the best juices of flowers, and works them into forms and orders by a mixture of its own essence ; while Boethius associates the stings of bees with those which forbidden pleasures leave behind :

Honey's flowery sweets delight ;
But soon they cloy the appetite.
Touch the bee, the wrathful thing
Quickly flees, but leaves a sting.
Mark here the emblems, apt and true,
Of the pleasures men pursue :
Ah ! they yield a fraudulent joy !
Soon they pall, and quick they fly :
Quick they fly, but leave a smart,
Deep fermenting in the heart.

A curious custom prevails in Sicily. When a couple are married, the attendants place honey in the mouths of the bride and bridegroom, accompanied with an expression of hope that their love may be as sweet to their souls as that honey is to their palate. Well might the ancients fable that bees encompassed the cradles of Homer,† Plato,

* Of this Rollin furnishes both precept and example. " An author," says he, " who draws honey from the nectarium of flowers, should convert the beauties he finds in the ancient writers into his own substance, thus ' making them his own, as bees do.' "—*Belles Lettres*, art ii., p. 2.

† Homer, says Alexander Paphius, was suckled by a priestess of Isis, whose breasts distilled honey : the first sounds he uttered were the notes of nine separate birds ; and on the morning after his birth nine doves were found in his cradle, fondling and playing around him.

Menander, and Simonides ;* well might Sophocles glory in the title which the sweetness of his diction procured for him ; and well might the Athenians take pleasure in perpetuating the appellation, by erecting a beehive of marble over his grave.

The Greeks not unfrequently chose the form of a beehive for many of their erections. There was a temple of Apollo at Delphos said to have been built by bees, no doubt in allusion to its external form. This mode of building prevails also in New-Caledonia, in the Isle of Carniobar, and in Seal Island. The Druids formed their houses, and not unfrequently their temples, in a similar manner. Sepulchres in Italy, too, are sometimes of an analogous shape.

The ancient Romans admitted into the number of their deities Mellona, whom they styled the Goddess of Honey ; while the Thessalians and Acarnanians offered bullocks to several species of insects which indicated superior intelligence, such as bees and ants. In Monmouthshire, the peasantry entertain so great a veneration for their bees, that some years since they were accustomed to go to their hives at twelve o'clock on Christmas eve in order to listen to their humming, which afforded, as they believed, a much more agreeable music than at any other period, as at that time they celebrated, in the best manner they could, the morning of Christ's nativity.†

What a beautiful picture is that presented by Virgil in the Corycian swain ! " I remember," says he, " an old Corycian, who lived under the lofty turrets of Obelai, on the banks of the Galesus. He

* Even the Hebrew writers describe honey as being the first food of a Son, born of a Virgin : his name Imanuel, that he may know how to refuse the evil, and to choose the good.—Vide Isaiah, vii., 14.

† The music of bees has been reduced to a scale : vid. Butler's Treatise, 1645, c. 5.

cultivated a few acres of land, which, till they came into his possession, had been waste and neglected. The soil was too poor for the plough, not adapted to the keeping of flocks, nor was it well situated for the culture of vines. Yet there, in a cottage standing among bushes, he cultivated herbs, lilies, vervain, and poppies. He was the first to pluck the rose in spring, the first to gather fruits in autumn. In winter he employed the principal part of the day in attending to the shrubs and flowers which were to furnish honey for his bees. In spring he fed them, in summer he watched their swarming, and in autumn gathered their honey. This was his sole employment from year to year; and in this occupation," continues Virgil, "being contented and happy, he was essentially richer than all the kings of the earth."

ANTS.

WITH bees we may associate ANTS, so variously treated of by Lewenhoeck, Swammerdam, Linnæus, Geoffrey de Geer, Bonnet, Latreille, and Huber. Ants, like bees, are divided into males, females, and neuter. Like those of bees, the males and females of ants seem to have no other duties than just to live and to keep up their race. The barren ones provide food, construct the habitations, nurture the young, and guard the citadel.

In building they exhibit much ingenuity, every one seeming "to follow his own fancy." Both the male and the female have wings; and when the heat has arisen to a certain height, they issue from their habitations, escorted by the labourers, who offer them food during the first stage of their emigration. Then the males and females take flight, during which the act of fecundation takes place. After this the males are left to themselves, and, being unprovided

with food, and incapable of procuring it, they soon die of want, while the females pursue their course for some little distance and seek out habitations, where, finding themselves destitute of labourers, they begin to work to procure for themselves food.

The few females which remain behind in the immediate neighbourhood, having been impregnated in their nests, are forcibly taken back by the labourers, who deprive them of their wings, feed them, and attend them till they have deposited their eggs. Ants are totally unacquainted with the economy of hoarding. They are almost entirely carnivorous, living upon other insects, and upon portions of such animal substances as they can find, and on the nutritious juices of gall insects and kermes; also on exudations from several species of the aphis, which the labourers take home for the males and females that do not work. This secretion of the aphis is supposed to be destined not only for its own subsistence, but for that of ants; for these insects are always in the neighbourhood of ant colonies, and they become torpid precisely at the same temperature. Some species of ants even collect the eggs of the aphis, and bestow upon them the same care that they do upon those of their own species. They also construct habitations for them at a small distance from their own nests, where they go to them and rob them of their secretions whenever they are in want. These secretions the aphis yields with the same willingness and docility that sheep and cows give down their milk.

Ants have parental and filial affections, friendly dispositions and social sympathies; and when any of the impregnated females die, they lick their bodies for several days, and pay them all manner of attention, as if they thought they could restore them to life. But, to balance these good qualities, they wage war not only against other insects, but small quadrupeds; and, like bees, against communities of

their own species. Some species of ants even engage in hostilities for the sake of making slaves of their enemies. These ants, to which Huber gives the name of Amazons, live in nests, in which also reside an inferior species of the same insect, which perform for them all the menial offices they require. At a certain season of the year these Amazons quit their nests in great numbers, in search of those which contain this inferior species, and when they find one a battle ensues. The Amazons almost always conquer, when they enter the nests of those they have subdued, and rob them of all their eggs and larvæ, which they take to their own habitations, and breed them up to maturity for slaves, as it were, and to perform, as before observed, every species of domestic service, as that of building, nourishing the young ones, providing food, &c. In one important particular these slaves are singularly fortunate. They perform all their duties with the greatest willingness and activity, and appear to love their masters as if they were of their own species.

This description of the manners of ants, so curious in itself, and so opposed to the generally-received opinion that, like bees, they hoard up for the winter, is founded on the patient researches of M. Huber, of Geneva. In respect to the aphids, it is curious to remark, that though females are produced every season, males are produced only once in ten years. Both of them are found on stems, leaves, and roots of trees and plants; and the females are exceedingly prolific.

Huber conceives that ants chiefly communicate with each other by signs and the sense of touch.*

* The younger Huber assigns to ants a species of language; and he thinks that the aphides and gall insects, upon which the ants depend for a considerable portion of their food, understand the antennal language as well as themselves. How curiously does this agree with what Origen says in his discourse against Celsus!—Lib. iv., 181.

“When they meet one another, they converse together; and

Fallow ants emigrate in a curious manner ; for they are led by a guide, who goes before, carrying an ant in its mouth. When it has fixed upon a spot it likes, both return to the nest, when each takes up an ant and returns to the place that has been chosen. Then all four revisit the parent nest, and return in a similar manner ; so that in a short time the whole, or that part of the family which proposes to emigrate, are removed to the spot selected by the first guide.

Such are the manners of the common ant in Europe. In Sweden ants erect structures which Dr. Clarke considers far more wonderful than the pyramids of Egypt. Malouet describes black-ant hills in Guiana twenty feet high ; and Smeathman and Vailant mention white-ant hills in Africa of an equal size. Whether these ants resemble in habits and manners those of Europe, we have not sufficient data to show. But of their destructive powers we have many well-authenticated accounts ; in proof of this, we are assured that " no anatomist can strip a skeleton so completely as they ; and that no animal, however strong, when they have once seized upon it, can escape them." In Surat the Hindus frequently feed them with flour out of charity, throwing them a handful whenever they appear.

INFLUENCE OF CLIMATE.

To peculiarities of climate have been attributed the principal shades of difference in national character. M. Denina, in a paper preserved in the "Memoirs of the Berlin Academy," and Tasso, in his parallel between France and Italy, have given it as their

hence it is they never lose their way. They are endowed with reason in all its degrees ; they have the use of speech and the knowledge of accidental things."

decided opinion, that a country marked with gentle eminences and gradually rising mountains is the most remarkable for men of genius, talents, and learning. Vitruvius and Vegetius attribute to climate an influence on the temper and constitution of men; and to the same influence Servius attributes the subtlety of the Africans, the fickleness of the Greeks, and the poverty of genius among the Gauls.

That climate has an important influence, and is the principal cause of the difference in national characters, has been also maintained with considerable ingenuity by Montesquieu. That celebrated writer imagines climate to exercise its principal power over the *manners*; while Cicero, Winkleman, Machiavelli, and the Abbé du Bos, with equal plausibility, argue for its influence over the *mind*. But as great events belong exclusively to no age, great genius belongs exclusively to no nation. Neither is there a virtue exercised, a talent cultivated, or a science improved, that may not be exercised, cultivated, and improved in the torrid and frigid zones as well as in the temperate. Absurd, then, is the dogma which would inculcate that man may be born in "too high or too low a latitude for wisdom or for wit." Both these hypotheses may, therefore, justly be doubted; for Greece has produced its Lycurgus, China its Confucius, and Rome its Pliny; France its Fenelon, Spain its Cervantes, Portugal its Camões, and Poland its Casimir. England has produced its Newton, Switzerland its Gesner, Germany its Klopstock, Sweden its Linnæus, and, to crown the argument, Iceland its two hundred and forty poets! This is sufficient for the hypothesis of Du Bos.

That climate affects the manners is equally ideal; for the crimes of the West have been equal to those of the East, and the vices of the South equal to the vices of the North. If they differ, it is not in their number, but in their quality.

When Du Bos says that the most sublime genius-

es are not born great, but only capable of becoming such; that want debases the mind, and that genius, compelled to write for bread, loses one half its vigour, it is impossible not to acknowledge the correctness of his observations. But when he proceeds to assert that genius is chiefly the result, as it were, of climate, we must appeal to facts.

Sir John Chardin seems to have given the tone to the opinions of Du Bos. "The temperature of hot climates," says he, "enervates the mind as well as the body, and dissipates that fire of imagination so necessary for invention. People are incapable in those climates of such long watchings and strong applications as are requisite for the productions of the liberal and mechanic arts."

But, disregarding hypothesis, let us look at results. Has not poetry been cultivated on the burning shores of Hindustan? in Java; in China; in Persia; in Arabia; in Palestine; in Greece; in Italy; in Germany; in France; in Britain; and in *Iceland*? That the poetry of one country does not suit the readers of another, merely shows that the beauty of poetry as well as of person is relative, all nations relishing their own poetry best.

In respect to architecture, also. Here we shall find that facts militate *in toto* against the hypothesis. The wall of China; the pagodas of India; the mosques of the Mohammedans; the ruins of Palmyra and Balbec; of Memphis and Thebes, and the Pyramids; St. Sophia of Constantinople; Athens; Rome; France and England—what do these various objects, cities, and countries prove, but that architecture has been successfully practised in every climate? The only difference consists in the diversity of tastes, some countries delighting in greatness of bulk, and others in greatness of manner.

I am even disposed to doubt the validity of the argument in respect to health. In Columbo, Ceylon, are assembled people from every variety of cli-

mate, and of every variety of complexion : African negroes, Caffres, Javans, Chinese, Hindus, Persians, Armenians, Malays, Cingalese, Malabars, Arabs, Moors, Portuguese, Dutch, English, and every shade of half-castes. They all enjoy health, which is, of itself, almost sufficient to prove that health does not depend upon parallels of latitude. The human frame is, in fact, alike adapted to equatorial heat and Arctic cold : the chief precaution required, therefore, in founding colonies, is to avoid situations where heat is accompanied by moisture.

In regard to virtue, too. If, in a particular country, one order of men is found capable of exercising the highest benevolence, why may not the people generally of that country do the same ? Every species of crime is committed in India, yet the Parsee merchants of Bombay exceed all the merchants in the world for active benevolence and philanthropy. This character was first given them by Ovington, and it has been attested by almost every traveller since. In a country exhibiting such a frightful dissoluteness of morals, it refreshes the soul to read of their virtues !

Climate has undoubtedly a great effect on the complexion : thus Europeans are white, the Arabs, Persians, and Chinese brown, the East Indians copper-coloured, and the Javans yellow. The Moors are swarthy ; the Africans, under the line, black ; and the natives of New South Wales of a dark chocolate. Still in America it is otherwise ; the natives of that vast continent being, with small diversity of shades, of a red copper colour, from north to south, and from east to west. The Esquimaux, who freezes near the arctic pole ; the Western Indian, who sleeps upon leaves, and has the woods for his canopy ; the natives on the Orinoco, who burn between the tropics ; the Peruvian, who sees the sun set behind the Cordilleras ; and the Brazilian, who beholds it rising out of the bosom of the Atlan-

tic, all bear the stamp of one original. The American Indians are remarkable, too, for the thickness of their skins and the hardness of their fibres: hence their comparative insensibility to bodily pain. They are distinguished, also, by a classical symmetry of figure. Indeed, so beautiful are their forms, that when the celebrated American painter West saw the Apollo Belvidere at Rome, so struck was he with the resemblance that he instantly exclaimed, "How like a young Mohawk warrior!" The Italians were not a little mortified at the comparison; but, upon the painter's describing the elasticity of their limbs, their dexterity in the use of the bow, and their indications of conscious vigour; and when he assured them that he had often seen these standing in the very attitude of the Apollo, with their eye following the arrow just discharged from the bow, they became reconciled to the exclamation of the painter, and felt the value of the criticism.

If we travel the globe from east to west, and from south to north, noticing every variety of climate, we shall find that in countries the most beautiful, as well as in the most savage and forlorn, great crimes disgrace the inhabitants. Warm climates dispose to indolence, cold ones to labour. In some islands, where Nature is the most luxuriant and profuse, we observe not only no genius, but no humanity, whether those islands are in the temperate or torrid zones. There are everywhere differences in manners, and modifications in the display of mental capacity; but for the cause of these we must look to something else than diversity of climate. For whence is it that in Persia and Arabia poetry is almost characteristic of the inhabitants: and yet in Egypt, nearly in the same parallel of latitude, and among the oldest of nations, not a single poet has ever been known. Then as to times and seasons: Orpheus lived in the infancy, as it were, of the human mind; Euripides in the prime of Grecian literature; Virgil

in the morning of Roman slavery; Boëthius in the evening of learning; Dante in the darkness of violence and superstition; and Camoëns in the dawn of maritime discovery. Genius depends, then, not on climates or countries, on times or seasons: it nowhere rises or falls with the barometer. It is the gift of Nature only, and its developments depend on an infinite variety of circumstances.

Arguing on the principles of Montesquieu, Raynal, Winkelman, Du Bos, and other plausible writers, it would be impossible to account for the diversity so distinctly observable in the dispositions, habits, and genius of people living on the opposite banks of frontier rivers; on the two sides of high mountains; and particularly of the same people at different periods of their history. Of this the ancient and the modern Greeks afford a striking exemplification. Both lived on the same soil and in the same climate, and yet how immense the difference between them.*

CHARACTERS AND HABITS OF ANIMALS.

It is curious to observe the peculiarities of animals in respect to their form, capabilities, manners, and habits. Let us notice a few of these. Wild horses live in communities, consisting of from ten to twenty, in the deserts of Western Tartary and in the southern regions of Siberia, each community

* This reminds us of a passage in Theophrastus: "I have often wondered," says he, in his Proem to the Characteristics, written in the ninety first year of his age, "and perhaps shall never cease to wonder, how it comes to pass that there should be so great a diversity in our manners, since all Greece lies under the same air, and all its inhabitants receive a like education." Theophrastus was mistaken: the inhabitants of the different Greek states had by no means the same education; and hence the phenomena which so much excited his astonishment.

being governed by a chief. When a male arrives at maturity, he is chased from the herd, and wanders about till he has assembled a few females, to establish an empire of his own. While feeding or sleeping they place a sentinel to keep watch, and on the approach of danger he gives the alarm by neighing, when the whole party set off with a speed that outstrips the wind. Wild asses congregate in the same manner; and antelopes associate together in bodies, frequently to the number of three thousand. The wild lamas of the Cordilleras live together also in large bodies, and station sentinels upon the summit of some neighbouring precipice. The Arctic walrus sleeps likewise in company with others, to the number of several hundreds, on the islands of ice along the coast of Spitzbergen and Nova Zembla, Hudson's Bay, the Gulf of St. Lawrence, and the Icy Sea. Ursine seals, too, are gregarious, each family consisting of from ten to fifty females, besides their young, commanded by the father, who exercises despotic authority.

Violet crabs live in communities among the mountains of the Caribbee Islands, whence they emigrate in immense bodies every year to the sea-shore to deposite their eggs. Green turtles are also gregarious. On shore they prefer the mangrove and the black-wood tree; but in the sea they feed upon weeds, as land animals do upon grass. When the sun shines they may be seen, many fathoms deep, feeding in flocks, like deer. Bees, wasps, and ants congregate together in a manner still more wonderful.

In some animals we observe a propensity to hoard for the satisfaction of the next day's appetite, in others for the entire winter's supply. The latter instinct is possessed by the beaver, the striped dormouse, the earless marmot, and the Alpine mole. There are birds, too, which have the same foresight, as the nuthatch and the tanager of the Mississippi:

the former storing up nuts, the latter maize. Some birds there are which take pleasure in hoarding what can be of no use to them, as the raven, the jackdaw, the magpie, and the nut-cracker of Lorraine. Some quadrupeds assimilate in the custom of sleeping by day and being active by night, as the Egyptian jerboa, the wandering mouse, the hedgehog, the six-banded armadillo, the great anteater, the tapir, the Brazilian porcupine, the flying squirrel of North and South America, and the hippopotamus of the Nile and the Niger. This curious propensity is observed also among certain birds, insects, and fishes, as the owl, the finch of Hudson's Bay, the whitethroat, the goat-sucker, the eel, the turtle, and the moth.

With these we may associate those flowers which expand their blossoms during the evening and the night, as the Pomeridian pink, nocturnal catchfly, several species of moss, the nightshade of Peru, the nightingale flower of the Cape, the *cereus grandiflorus*, and the tree of melancholy growing in the Moluccas; the numerous family of the *conservæ*, *charas*, many kinds of *ranunculi*, and almost every species of aquatic plant. So, also, many beautiful flowers have no scent, while many beautiful birds have no song, and many animals of symmetrical shapes are of no use to mankind. Some plants will exist for months without water: serpents are equally abstinent; and sloths will exist forty days without any kind of food.

Few animals require habitations, they being sufficiently protected by their wool, hair, or scales. The soldier-crab, however, shelters himself in the discarded shell of the lobster. On the banks of the Congo, the African ants erect mushroom-like habitations, sometimes forming whole villages. Beavers show more intelligence in regard to their security than any other animal; and not only build in a manner more consonant with reason than the sav-

age by whom they are pursued from one rivulet to another, but are more than equal to him in providing against the intensity of cold and the occurrence of want.

Some insects form nests for their young; others have methods still more curious for their protection. Thus the ichneumon-fly deposits its eggs in the body of a caterpillar with the point of its sting. These become maggots, which feed upon the live body of the caterpillar that matured them. The sphinx genus of insects are less cruel, depositing theirs only in spiders and caterpillars that are already dead. The ox-fly lays its eggs in the hides of oxen; another species in the nostrils of sheep; and another upon the manes and hair of horses, which the horse licking, takes into its stomach, where they become bots, and not unfrequently cause the animal's death. The chegoe of the West Indies deposits its eggs under the human skin; and, unless the bag is removed, mortification frequently ensues.

Animal Affinities.—Animals of different genera resemble each other not unfrequently in the attitudes they respectively assume. The leech, when touched, rolls itself into a spherical form. The gally-worm also rolls itself up like a ball: so does the oniscus armadillo; and the *domesticus dermestes*, when in the least alarmed, draws its feet under its abdomen, and its head beneath its thorax, and seems to be dead. Thus these insects have an affinity in manners with the hedgehog and the three-banded armadillo. The latter is armed with a shell that is almost invulnerable; but, when pursued by hunters, it coils itself up and rolls down the steepest precipices, leaving the hunter, while lamenting its escape, to admire its courage. The drumfish of Peru, in the same manner, if alarmed, inflates itself till it is round, when none of its enemies can either bite or swallow it; its size preventing the latter and its shape the former.

Curious affinities may be also traced in the language of animals. The Hindustan antelope chews the cud like a lama, lies down and rises up like a camel, croaks like a raven, and, at a certain time of the year, has a rattling in its throat like the deer. The eared owl of Brazil sports and frolics like a monkey; leonine seals roar like angry bulls; the female lows like a calf, and the young ones bleat like sheep; while the raven fowls like a hawk, fetches and carries like a dog, steals like a jay, whistles like a boy, and speaks like a man.

Similarities may be observed, too, in the separate parts of particular animals. Thus the camelopard has horns like a deer, and a neck in some measure like a camel; it is spotted like a leopard, and has a tongue and ears like a cow. The Nhu antelope has the mane of a horse, the head of a heifer, and its hind parts resemble those of a mule. The barbyrousa of Boura has the shape of a stag, a nose and tail like a boar, feet like those of a goat, the legs of a roebuck, and hair like that of a greyhound.

Some animals bear resemblances to each other in having striking olfactory partialities and antipathies. The olfactory power of the reindeer is so great that he can discover where the *lichen rangiferinus* lies, though buried under the snow. When he comes to a spot where it is concealed, he smells it and digs for it. Several ostriches lay their eggs in one nest. If they are touched by any one, they are sure to discover it on their return by the smell: they break the eggs, and never again lay in the same nest. Even insects possess the olfactory sense. Bees and flies love the perfume of flowers; ants hate cajeput oil; and cockroaches have a deadly aversion to camphor.

Some animals are peculiarly sensitive to particular sounds. Horses become animated at the sound of trumpets and at the cry of dogs in the chase; elephants delight in music; the camel, when fatigued

with a long journey over the deserts, will revive in an instant when its master sings loudly or plays upon a musical instrument. Bees are soothed by timbrels; and mullets are attracted to the hooks of the negroes in Africa by clappers, which the waves knock against pieces of wood to which they are attached.

Characters of Men traced in Animals.—We may even recognise human characteristics in animals. Thus in the jay we may trace the airs of a petulant girl; the magpie has all the restlessness, flippancy, vanity, and intrusion of the beau. The selfish we may compare to the one-horned rhinoceros, since it is incapable either of gratitude or attachment; the intemperate to the rougette bat, intoxicating itself with the juice of the palm-tree; a man easy of forgiveness to the Cape antelope; fierce when assailed, yet taking food within a minute, even from the hand which struck it; while a man who derives his enjoyment from his family seems animated with the same spirit as the antelope of Scythia, which will seldom eat unless surrounded by its mate and her little ones. Envious men and calumniating women we might liken to serpent-eaters, such as the porcupine, the deer of Afghaunistan, the *ciconia* of the Arctic regions, and the secretary bird. Indian antelopes, like old men, sequester themselves and become solitary in age. The green maccaw is a perfect emblem of a jealous wife. If its master caress a dog, a cat, a bird, or even a child, nothing can exceed its anxiety and fury; nor will it be appeased till he forsakes the new favourite and returns to it.

Some men resemble the great bat of Java. This bat, when hurt and unable to revenge the injury, wreaks its vengeance on its own wounded limb. The Japanese, out of revenge to others, in the same spirit, not unfrequently rip open their own bodies. Other men are like the tavoua parrot of Guinea.

This parrot is one of the most beautiful of its tribe, but is the most ferocious in its intentions, when it exhibits a disposition to caress. Wise men sometimes appear blind, and then the fool supposes them unable to see. But he is ignorant that some birds, by means of the nictitating membrane, cover their eyes without shutting their eyelids. Obstinate men may read their characters in that of the Arctic puffin and of the Lapland mouse. The former seizes the end of a bough thrust into its hole, and will not let go till it is drawn out and killed. The latter descend in vast bodies from the mountains, and will not, in their progress, move out of a direct line for anything. They have eyes, and yet they run against stones, rocks, and animals, and bite and contend with every object that they meet. They pass rivers and cross lakes, and, when they arrive at the sea, plunge in and are lost. Men who are solitary from bad passions resemble the tenebrio beetle, which is so unsocial that two of them are scarcely ever seen together. How many men are there who resemble the *larus arcticus*? This bird never fishes itself, but lives upon fish caught by other birds, which it pursues. They drop their prey from fear, and the *larus* seizes it before it falls into the water.

ADORATION OF ANIMALS.

ANIMALS have even been raised by the folly and impiety of mankind to the rank of deities. "It is better," says Lord Bacon, "to have no opinion of God at all, than such an opinion as is unworthy of him; for the one is merely unbelief, the other is contumely."

The Pyramids are the tombs of bulls. In a sarcophagus found in the second Pyramid by Belzoni were discovered bones which at first were supposed

to be those of King Cephrenes; but, upon a scientific survey, they proved to be those of an animal belonging to the *bos* genus. Hence it has reasonably been supposed that the Pyramids were erected, not for the interment of kings, but for the deposition of Apis. Belzoni also believed that the most magnificent of the tombs at Thebes was destined for the same purpose. How far human folly has gone, and can yet go, may be estimated by the following facts: Herodotus asserts, and from him Strabo, that the first temples in Egypt were for the reception of the insects, fishes, reptiles, birds, and quadrupeds that the inhabitants worshipped. Swine were adored in Crete, weasels at Thebes, rats and mice in Troas, porcupines in Persia, and some writers even assure us that the Thessalians and Arcanians dedicated bullocks to ants and flies. The custom of worshipping animals prevailed also among the Egyptians, Syrians, Scythians, Hindus, Chinese, Tonquinese, Tibetians, and Siberians, Greeks, Romans, and Celts.

Some of the Malabarese adore the Pondicherry eagle, the most rapacious of birds. In Madura they venerate the ass, and suppose the whole race to be animated with the souls of their nobility. The inhabitants of Benin regard certain animals as mediators between them and the Deity; and the natives of Siam and Pegu believe white elephants to have the souls of their deceased monarchs residing in them. The Sandwich Islanders earnestly entreated the Europeans not to injure their ravens: "They are Eatoos of deceased chiefs," said they. In many islands of the South Seas the owl is venerated; in Mexico the lapwing; storks in Morocco; bulls in Benares. The serpent was worshipped by the Lithuanians, the Samogitians, the Africans of Mozambique, and the natives of Calicut. In Surinam this reptile is still held sacred, and its visits are regarded as highly fortunate: its colours are resplendently

beautiful. The serpent was also once worshipped in Greece ; and Vishnu, the Indian god, is frequently represented under its form. In May, 1819, a golden image with five heads, made of pure gold of Ophir, was discovered among the Paishwa's family deities. It weighed 370 tolas ; and the serpent-headed god was represented in the act of contemplating the creation of the world. The Hindus never molest snakes. They call them fathers, brothers, friends, and all manner of endearing names ; and on the coast of Guinea snakes are revered so highly, that in Bosman's time, a hog happening to kill one, the king ordered all the swine to be destroyed.

REASONING FACULTY IN ANIMALS.

THAT beasts have reasoning faculties has been argued by Plutarch, Montaigne, and other writers, with great force of argument. Certainly many things that we observe in them it seems difficult to account for on any other supposition. Thus serpents obey the voice of their masters ; the trumpeter-bird of America follows its owner like a spaniel ; and the *jacana* acts as a guard to poultry. It preserves them in the fields all the day from birds of prey, and escorts them home regularly at night. In the Shetland Islands there is a gull which defends the flock from eagles ; it is therefore regarded as a privileged bird. The chamois, bounding among the snowy mountains of the Caucasus, are indebted for their safety, in no small degree, to a peculiar species of pheasant. This bird acts as their sentinel ; for as soon as it gets sight of a man it whistles, upon hearing which the chamois, knowing the hunter to be not far distant, sets off with the greatest speed, and seeks the highest precipices or the deepest recesses of the mountains. Eagles, and some other

of a mile square in extent; and yet such is the order and regularity with which they move, they never incommode each other; and when they approach a vineyard, they send out spies to explore places for them to settle on.

Some birds are artisans. The razor-bill fastens the only egg which it lays to the bare cliff with cement, while the East Indian tailor-bird sews together the leaves of trees. To effect this it uses its bill as a needle, and the small fibres of plants for thread. The *loria* of Bengal is also a remarkable bird, and has no disinclination to intercourse with mankind. In a wild state it builds upon the Indian fig-tree, and suspends its nest from the branches in a manner that secures it against all injury from the wind. Its nest consists of two, and sometimes of three chambers, in which fireflies are occasionally found; and these insects the Hindus believe the bird cherishes for the purpose of illuminating its home.

That animals have some sort of reasoning powers, few, I think, who have reasoning faculties themselves, and sufficient knowledge of natural history to form an opinion, will venture to deny. Their great want is the faculty of teaching beyond a certain extent.

“See to what point their labours tend,
And how in death their talents end!
Perfect the bird and beast we find,
Advance not here their several kind;
From race to race no wiser grow,
No gradual perfection know;
To increasing knowledge void their claim,
Still their specific powers the same,
In th’ individual centred all,
Though generations rise and fall.”

There is, however, a species of tuition which many animals are equal to. Old birds, for instance, teach their young ones to sing and to fly, and a long and curious process both of them are; while ants not only instruct their little ones to draw sustenance

from the aphids, but to carry other ants upon their backs and make slaves of them.

That some animals have also the capacity to improve their instincts appears certain: and Blumenbach confirms the observation, by showing that beavers are capable of directing their operations according to circumstances, in a manner far superior to the unvarying mechanical instinct of other creatures. That some birds, too, vary their methods of building according to the materials which they have to build with, is evident from what Wilson, the American ornithologist, says in regard to the Baltimore oriole and the ferruginous thrush.

That most quadrupeds have all the bodily senses that man has, and that many of them feel the various passions by which man is distinguished, would seem to be certain. In fact, it is impossible to watch them minutely without perceiving that many of their feelings and passions are similar to our own. Even insects exhibit fear, anger, sorrow, joy, and desire; and many of them express those passions by noises peculiar to themselves.

Milton makes Adam master of the language of animals, and the Deity to speak thus:

“What call'st thou solitude? Is not the earth,
With various living creatures, and the air,
Replenish'd, and all these at thy command,
To come and play before thee? *Know'st thou not*
Their language and their ways? They also *know*,
And reason not contemptibly.”

ANIMAL CHANGES.

VEGETABLE life in many particulars resembles animal life. Thus, for instance, many vegetables resemble certain animals in their annual exhibitions of change. The cork-tree renews its bark; and for eight seasons its quality improves as the tree ad-

vances in age. The marine fan-palm has a new leaf every month; during the same period the Indian bamboo issues a new shoot; and many bulbous roots have concentric rings proportionate to the number of months they have vegetated; while the cocoa-tree of the Maldiv Islands each month produces a cluster of nuts. Of these, "the first," says an eminent French naturalist, "is in a state of incipency, the second is coming out of its covering, the third is budding, the fourth is in flower, the fifth is forming a nut, and the last is in maturity."

Sheep renew their fleeces every year, lobsters their shells, and scorpions, serpents, snakes, grasshoppers, and many other insects, their skins. Stags, goats, and some other animals also shed their horns, though not, perhaps, at stated periods. The Asiatic hedgehog loses its hair during its four months' state of torpidity, and the peacock sheds its fine feathers in autumn, and renews them in the spring.

The corn-weevil undergoes several changes in the concavity of grain. The nut-weevil deposits its egg in a nut, while the latter is yet green and soft. This egg is hatched when the nut is ripe, and becomes a maggot, which feeds upon the kernel. After it has consumed the kernel it bores a hole through the shell, creeps out of it upon a leaf, or falls to the ground, where it buries itself, and becomes the next season a small brown beetle.

The caterpillar changes its skin several times before it enters its aurelia state. When it is about to enter it, it spins a cone in which it envelops itself, and remains for some time motionless. At length it issues from its mail, expands its wings, and becomes an object of delight to childhood, and the ornament of the woods and fields. Similar transformations may be observed in bees, wasps, ants, and other insects. Caterpillars become butterflies,

and grubs moths. Silkworms, however, become moths that neither fly nor eat.

Insects of the *hemiptera* order, as locusts, crickets, grasshoppers, the walking leaf of China, Peruvian lantern-flies, and others of the *fulgora* genus, want little of perfection when they issue from their eggs. They undergo, therefore, but little change from infancy to age. But, in general, insects exhibit themselves in three separate states after issuing from their eggs: the *larva*, the *pupa*, and the *imago* states. These, however, are merely so many separate stages in the development of the insectile organs, every insect having, in its earliest state, all those organs in miniature which they afterward seem to acquire. Thus in the most helpless of larva may be recognised through a microscope all the rudiments of a perfect insect.

The frog proceeds from an egg in the form of a roundish black or brown substance, having a tail. In ninety-seven days eyes appear, and in two days more arms, when the tail drops and the animal becomes a perfect frog. Toads are formed in a similar manner. The frogfish of Surinam even returns to its original state: it is first a fish, then a frog, and after many years changes to a fish again.

Caddice-worms, enclosed in cases formed of sand, leaves, and minute pieces of wood, crawl along the bottoms of quiet streams, become perfect insects, rise to the surface, quit their houses, hover over the stream, drop their eggs into the water, and die. The ephemera tribe reside for three years in brooks and rivers in their reptile state, having gills like fish. After passing their aurelia stage, they emerge from the water in a shape resembling that of the butterfly; but their lives are prolonged only to the extent of a few hours: they drop their eggs, fall to the earth or into the water, and die almost immediately after.

The larvæ of the *libellula* tribe also remain for

two or three years in the water. They then creep to the top of a plant, burst their covering, and fly into the air. Guats, when they issue from their eggs, are worms, which reside at the bottom of standing waters. These worms change their forms, assuming large heads and hairy tails. Soon, however, they divest themselves of this appearance by parting with their antennæ, tails, and eyes: their heads then become invested with a plume of feathers, and their bodies covered with scales and hair. Minute feathers are attached to their wings, and they are furnished with a trunk of exquisite formation.

The *pulex irritans* issues from an egg in the shape of a worm, of a pearl colour. In a short time it hides itself, spins a thread from its mouth, and after laying enclosed in the covering it thus forms for a fortnight, issues from its confinement a perfect animal, defended by a species of armour.

The lion-ant, after remaining in its reptile state from one to two years, spins a thread, which, being glutinous, sticks to small particles of sand, and in this it rolls itself up like a ball. Here it continues for six or eight weeks, when, gradually parting with its skin, feet, antennæ, and eyes, it pierces a hole through the ball, and appears in the form of a fly, having a brown slender body, a small head, large eyes, long legs, and transparent wings.

May-bug beetles deposite their eggs in the earth, from which the young creep out in the shape of maggots, and live in the earth for three years, feeding upon roots. While under ground they change their skin every year, and at the end of the fourth dig themselves a cell, cast their skin, and pass into the chrysalis state. In the succeeding May they burst from the earth, unfold their wings, and fly round the tops and sides of trees.

The ox gadfly introduces its egg into the skin of the ox, and it produces a yellowish maggot. This maggot falls to the ground, burrows, and enters into

the aurelia state, whence it issues a fly of a pale yellowish brown colour, marked with dusky streaks, and about the size of a bee.

Some worms lodge themselves under the tongues of dogs, others in the nostrils of macaws, and some in the heads and even throats of deer. I once put a moth among some leaves under a glass. It deposited several eggs and died. In a few days the eggs, being placed in the sun, burst, and out of them crept insects with wings, resembling their parent as little as turtles resemble an elephant.

As the human being approaches old age, the skin, flesh, and fibres become more dry and hard. Digestion is more difficult; there is less perspiration; the circulation of the blood is languid, and life fades away by insensible degrees. This decay seems to arise out of the circumstance that the carriers of matter for the repair of the vascular system cannot carry enough wherewith to repair themselves.

The act of converting food into animal matter is chiefly performed by the stomach, the gastric juice found in it constituting the chief menstruum. By a process at once simple and intricate, food is converted into chyme, which, uniting with the bile and other juices, is formed into chyle, a substance resembling milk. This chyle is conveyed by the lacteal vessels to the heart. In this reservoir it begins to form blood, which, passing through the lungs, is modified and perfected by respiration, and by one of the most beautiful of processes is distributed by the arteries, and strained into the proper vessels, converting vegetable and animal substances into nerves, sinews, flesh, bone, and every other part of the human machine, as vegetable juice is indurated into amber, and the leaf of the mulberry formed into silk.

Other changes take place in the animal system which would lead us too far into technical peculiarities. But there is one circumstance too curious to

be overlooked : it belongs to the ear. While all the other bones of the human frame increase and acquire strength by time, those that lie in the cavities of the ears are perfect even before birth. They may therefore be said to have a longer duration in respect to perfection than any other part of the human body. As to those changes which are caused by the vibratory motion of the nerves, begun by external objects and propagated to the brain, they are so numerous and so delicate that it would require a volume of no ordinary magnitude to explain them, and even then the subject would be but partially treated.

All animals are compounded of vegetable substances. The hoof of the horse ; the horn of the cow ; the shell of the snail ; the teeth of the elephant ; the claw of the lion ; the feathers of the dove ; the wool of the sheep ; and the hair of the camel, all once grew, as it were, in the fields. The eyes with which we see, and the ears with which we hear ; the blood of our fathers, the arms of our sons, and the cheeks of our daughters, are all ultimately derived from vegetables, having their roots in the soil, and drawing their sustenance from it ; proving the truth of the doctrine that man came from the "dust."

ANALOGIES BETWEEN PLANTS AND ANIMALS.

PLANTS claim some affinity with animals. The stalk of the former resembles the body of the latter ; the root the stomach ; the bark the skin ; the pith the marrow, and the juice the blood. Like animals, too, plants are subject to a great variety of disorders. They imbibe air and moisture by their leaves, and food by their roots ; both being transmitted into their own substance, as theirs is after-

ward into the substance of animals ; for the entire frame of animated being derives its form and its consistence from vegetable organizations.

Some writers confound sensation with the power of motion ; and if no motion is perceived, they cannot imagine the existence of sensation. But oysters have no more the locomotive power than thistles ; and they can no more forsake the beds in which they are deposited by the tide, than fishes can swim without water, or birds and insects fly without air. Vegetable sensation, however, is not animal sensation ; and it is no feeble mode of supporting this argument to remark that, as Nature furnishes compensations to all, she would never have ordained so cruel a result as animal sensation to plants, without giving in turn the power of defence. A few plants, it is true, seem to be endued with this faculty ; some by the noxiousness of their qualities, and others by the peculiarity of their structure ; as the nettle, the thistle, the *noli me tangere*, the thorn, the rose, the holly, the *kamadu* of Japan, with the deadly nightshade, and other poisonous plants. Yet these plants, armed as some of them are against attacks, and as others are against animal use, support innumerable insects. Some plants open their petals to receive rain, others avoid it. Some contract on the approach of a storm, and others at the approach of night ; while some expand and blossom only to the evening air. Near the Cape, certain flowers form a species of chronometer. The *Moræa unguiculata* and *undulata* open at nine in the morning, and close at four ; the *Ixiq cinnamonea* opens at the time the other closes, and sheds a delicious perfume during the night. The Mexican marvel of Peru also closes at four.

The stamina of the flowers of sorrel-thorn are so peculiarly irritable, that when touched they will incline almost two inches ; and the upper joint of the leaf of the *Dionæa* is formed like a contrivance

to catch food. When an insect, therefore, settles upon its glands, the tender parts become irritated, the two lobes rise up, grasp the insect, and crush it to death. The sensitive plant shrinks back and folds its leaves upon being touched, after the manner of a snail; and a species of the *hedysarum* of Bengal has its leaves during the day in continual motion: on the approach of night they sink from their erect posture, and seem to repose. Nor is this motion confined to the time when the plant is in full perfection; for if a branch be cut off and placed in water, the leaves will, for the space of an entire day, continue the same motion; and if anything be placed to stop it, no sooner is the obstacle removed than they resume their motions even more actively than before, as though they endeavoured to recover the time previously lost.

The plane-tree exhibits the power of exercising a sagacity for securing food not unworthy of an animal. Lord Kaimes relates, that among the ruins of New Abbey, in the county of Galway, there grew in his time, on the top of one of its walls, a plane-tree upward of twenty feet in height. Thus situated, it became straitened for food and moisture, and gradually directed its roots down the side of the wall till they reached the ground, at the distance of ten feet. After it had succeeded in this attempt, the upper roots no longer shot out fibres, but united in one, and shoots vigorously sprang up from the root that had reached the earth.

The Island of St. Lucia presents a still more curious phenomenon in the animal flower. The plant producing this flower grows in a large basin, the water of which is brackish. It is more brilliant than the marigold, which it resembles. When the hand is extended towards it, it recoils and retires, like a snail, into the water. It is supposed to live upon the spawn of fish.

The tamarind closes upon its fruit when the sun

has set, in order to protect it from the dew; and in Ceylon and Java there is a plant (*nepenthes distillatoria*) remarkable for having a small vegetable bag attached to the base of its leaves. This bag is covered with a lid, which moves on a strong fibre, answering the purpose of a hinge. When dews or rains descend, this lid opens, and when the bag is full, the lid falls and closes so tightly that no evaporation can take place. The moisture thus imbibed cherishes the seed, and is gradually absorbed into the body of the plant.

Some plants bear fruit on the backs of their leaves; as spleenwort, maiden-hair, fern, brake, pepper-grass, and many species of moss. After the same manner, the Lapland marmot, the spider, and the American scorpion, carry their young upon their backs wherever they go, in case of alarm. The *monoculus* insect carries its young on its back even in the water; but the Surinam toad exhibits a still more wonderful phenomenon: its eggs are buried in the skin of its back. When the animals enclosed in those eggs burst from their shells, the mother is seen crawling with her family attached to her; some still in the egg, others just emerging out of it, and some clinging to various parts of her body.

If some vegetables exist without roots, there are animated beings, in turn, which are propagated after the manner of plants. If the earthworm be divided into two parts, each part becomes a perfect worm. The head portion acquires a tail, and the tail portion a head. The starfish may be separated into many parts with similar results: and if the polypus be divided into 500 parts, each part becomes a perfect polypus. Indeed, polypi exhibit the most wonderful phenomena, in regard to increase, of any objects in nature; for they propagate like quadrupeds, like insects, like fishes, and like plants. Some are viviparous, and some issue from an egg; some may be multiplied by cuttings, and others grow out

the bodies of their parent like buds out of trees, and from which they fall, much after the manner of the *testuca ovina* of northern latitudes.

NATURAL AND MORAL ANALOGIES.

THERE is an analogy between external appearances and the interior affections, strikingly exemplificative of that general harmony which subsists throughout the universe; for infinite are the relations and analogies which objects bear to each other; harmonies which give ample scope to the liveliest imagination. It is from these analogies that the heavenly bodies have been considered symbols of majesty; the oak, of strength; the olive, of peace; and the willow, of sorrow. One of the Psalms of David, pursuing this latter analogy, represents the Jews as hanging their harps upon the willows of Babylon when bewailing their exile from their native country.

The yellow-green, which is the colour Nature assumes at the falling of the leaf, was worn in chivalry as an emblem of despair. Red is considered indicative of anger, sometimes of guilt;* green, of tranquillity;† and brown, of melancholy. The lotus‡ was regarded in Egypt as an emblem of the

* "Come, now, let us reason together, saith the Lord. Though your sins be as scarlet, they shall be as wool."—Isaiah, i., v. 18. When Moorcroft was about to take leave of the Lama of Nārāyan, on his journey to Mánasanawara, the Lama took his friend's white garment in his hand, and said, "I pray you, let me live in your recollection as white as this cloth."

† Green, in heraldry, is used to express liberty, love, youth, and beauty; and all acts and letters of grace were at one time signed with green wax.

‡ Because it vegetates from its own matrice. The lotus is esteemed sacred in Thibet, Nepaul, and Hindustan. On its bosom Brahma was supposed to have been born, and on its petals Osiris delighted to float. This flower is very common along the countries bordering the Senegal, the Gambia, and the Niger.

creating power ; and the cypress has long been acknowledged an emblem of mourning ; the swan, of graceful dignity ; the violet, of modesty ; the myrtle, of love ; the tulip, of vanity ; the aloe, of constancy ; the mulberry, of prudence ; the lily of the valley, of innocence ; the rose, of beauty ; the Fuschia, of magnificence ; and the palm and laurel, of honour and victory.

Branches of palms were in ancient times esteemed emblems of mental and bodily vigour, and the white violet of love. The amaranth was emblematic of immortality. St. Peter promises an amaranthine crown ; and Milton says the amaranth bloomed in Paradise, but for man's offence was removed to Heaven, where it still grows, shading the fountain of life, near which the river of bliss rolls in streams of amber ; while the angels are represented as wearing crowns and wreaths of amaranth.

The yew-tree has been considered an emblem of mourning from the earliest times. The more ancient Greeks planted round their tombs such trees only as bore no fruit ; as the elm, the cypress, and the yew. This practice they adopted from the Egyptians ; the Romans borrowed it from the Greeks, and the Britons from the Romans. From long habits of association, the yew acquired a sacred character, and was therefore considered as the most appropriate ornament for consecrated ground. The custom of placing them singly is equally ancient : Statius calls it the solitary yew. It was at one time as common in the churchyards of Italy as it is now in North and South Wales, where in many villages the yew-tree and the church are coeval with each other.

The palm, the plantain, and the olive have been used as emblems of peace by many nations. Hence Tasso calls the former "the sacred palm." The natives of Australia del Espiritu Santo invited the friendship of the discoverers by holding boughs of

palm-trees in their hands; and when Vancouver was at the Island of Otahete, the messenger whom he had sent to inform the king of his arrival returned with a present of plantain as a peace-offering. Branches of trees seem in all ages and countries to have been used as emblems of peace, from the time of Noah to that of Hannibal, when the inhabitants of one of the Alpine towns met him with garlands and branches. "We have planted the tree of peace," says an American Indian, "and buried the axe under its roots: we will henceforth repose under its shade; and we will join to brighten the chain which binds our nation together."

In nearly all the empires, countries, and islands of Eastern Asia, peace, friendship, and benevolence are signified by the presentation of a betel leaf. In Africa, also, a leaf or bough is emblematic of the same. When Captain Tuckey, in his expedition to the Congo, appeared at a feast given by the *chenoo* of Embomma, the latter seemed dubious as to the real motive of his voyage. At length an old man rose up hastily, and, taking a leaf from a neighbouring tree, exclaimed, "If you come to trade with us, swear by your God and break this leaf." This Captain Tuckey refused to do. Then said the old man, "If you come with no design of making war upon us, swear by your God and break this leaf." Captain Tuckey immediately took the oath and broke the leaf. Upon which the whole party rose up, and danced for a considerable time, and all was cheerfulness and satisfaction.

Palms were worn as emblems by those who had made pilgrimages to the Holy Land; and the custom of carrying branches of palms on Palm Sunday was introduced into the service of Christianity by Origen.

Garlands of olives are also of high antiquity. It was with one of these that the women of Jerusalem crowned Judith as she returned from the camp of

Holofernes. They met her on the way, and blessed her, and led her in triumph to Jerusalem, carrying olive-branches in their hands, and singing songs in honour of her.

By analogy we associate youth with spring, manhood with summer, and autumn with that season of life when, as Shakspeare expresses it, we are fallen into "the sere and yellow leaf:" winter we associate with age.

"Behold, fond man!

See here thy pictured life : pass some few years,
Thy flowery spring, thy summer's ardent strength,
Thy sober autumn fading into age ;
And pale concluding winter comes at last,
And shuts the scene !"

What can be more pathetic than the passage in Milton where he compares blind Thamyras, Tiresias, and Mæonides to the nightingale? And is there a finer instance of the application of the works of Nature to moral illustration, than where he likens the progress of crime to the lengthening shadows of the setting sun? What can be more grand than where he compares Satan to Mount Teneriffe, and to the sun in eclipse? When Blair says that men see their friends drop off like "leaves in autumn;" when Shakspeare compares the unfortunate Richard to "the evening sun," and a man of high reputation "to a tree blushing with fruit;" when he likens glory to "a circle in the water," and the fall of Wolsey to a "falling meteor," how affecting, and instructive too, do the subjects become!

The Epicureans illustrated their idea of happiness by asserting that a happy life was neither like a pool nor like a torrent, but like a gentle stream, that "glides smoothly and silently along." One of the odes written by Neyahualcojolt, king of Mexico—the Howel Dha of that empire—compares the tyrant Fezzomoe to a stately tree which had extended itself into many countries, and spread the shadow of

its branches over them ; but at last, eaten by the worm at its root, wasted away and fell to the earth.

Sometimes the poets draw similitudes from the phenomena of the heavens. Sophocles compares the changeableness of Menelaus's fortune to the frequent waning of the moon ;* and Heliodorus likens Chariclea, clad in a dress of poverty, to the same luminary rising among the clouds. Dryden has a fine metaphor in his play of "All for Love," where Antony compares himself to a meteor : an idea more than once adopted by Rowe and Congreve. Haller compares reason to the moon, and revelation to the sun.

No poets draw more frequently from Nature than the sacred writers.† The fact is, there is scarcely a simile in the Scriptures that has not an immediate reference to natural objects. How beautiful is that passage in St. John where Christ says to the woman of Samaria, "Whosoever drinketh of this water shall thirst again ; but whosoever drinketh of the water that I shall give him, shall never thirst."

Most of the similes and illustrations of Ferdousee, Hafiz, Sadi, and other Oriental poets, are also drawn

* What a beautiful passage is that in the *Winter's Tale*, where Polyxenes, questioning the shepherd respecting the love which Florizel bears to Perdita, the shepherd replies,

" Never did the moon
So gaze upon the waters, as he'll stand
And read my daughter's eyes.

† See the parable of the wasted vine in Ezekiel, ch. xix., v. 10, and of the two eagles and a vine, ch. xvii., v. 1. An admirable instance, too, occurs in Isaiah, ch. xv. The parable of the trees and the bramble is well known (Judges, ch. ix., v. 8), as is the celebrated passage in Isaiah where the glory of Assyria is compared to a cedar. In Numbers, Balaam, seeing the tents of Jacob pitched in the plains of Moab, exclaims, "How goodly are thy tents, O Jacob, and thy tabernacles, O Israel : as the valleys are spread forth : as gardens by the river side ; as the trees of aloe which the Lord hath planted ; and as cedar-trees beside the waters" (ch. xxiv., v. 5, 6).

from the natural world. Tasso, too, has scarcely one that has not a similar derivation. Thus he compares Argantes to a comet; the fury of Solyman to a stormy ocean, seen at intervals through flashes of lightning; and the virtues of Rinaldo to a tree bearing fruit and blossoms at the same time: Armida, recovering from a swoon, to a rose restored by the dew; the archangel Michael to a rainbow; the softening of Armida's anger to snows melting in the sun; and the sound of an army to the distant murmuring of the waves.

Milton abounds no less in references to natural objects, though he frequently illustrates his subjects by allusions to the arts and sciences. The legions of Satan he compares to the autumnal leaves that "strew the brooks of Vallambrosa;" the rising of Pandemonium to an exhalation; the applause of the darkened angels to the sound of winds rushing from hollow rocks upon the billows; and the atoms of Chaos to the unnumbered sands of Barce or Cyrene. The countenance of Eve he likens to the first smiles of morning; the combat of Michael and Satan to two planets rushing from their orbits and confounding the spheres: Satan to a comet; his shield to the moon; his standard to a meteor; his frown to a thunder cloud; and his recoil from the force of Michael to a mountain sinking in an earthquake.

Virgil, also, has perpetual allusions to the animal and vegetable world. The instances where he compares Orpheus to a nightingale; the love of Dido to the anguish of a wounded stag; and the engagement of Tarchon and Venulus to the combat of an eagle and a serpent, are exceedingly beautiful. The last is assuredly the finest of all his similes; as the one where the ecstasy of a good man at the approach of death is compared to the music of a dying swan, is the most exquisite in Plato.

But of all writers, ancient or modern, Ossian* is the poet who may strictly be styled the Poet of Nature, since there is scarcely a single allusion that does not expressly refer to her productions. To quote instances were to quote the whole of his poetry; but the following is so exquisite that the reader will pardon its introduction: "Ullin, Fingal's bard, was there; the sweet tree of the Hill of Cona. He praised the Daughter of Snow, and Morven's high-descended chief. The Daughter of Snow overheard, and left the hall of her secret sigh. She came in all her beauty, like the moon from a cloud in the east. Loveliness was around her as light. Her steps were like the music of songs." Surely Homer has nothing in its kind superior to this.

CHYMICAL, ATMOSPHERICAL, AND VEGETABLE CHANGES:

THERE is no animal, vegetable, or even mineral but undergoes perpetual increase or diminution of weight. They are expanded by heat, contracted by cold, or affected by the substances with which they are combined. It is no invalidation of this position that many of these changes are neither visible to the human eye, nor sensible to human touch. Gold, platina, and silver are less liable to change than any other metals; but even their changes are frequently apparent. The ten simple earths are not only inca-

* The authenticity of Ossian's poems has been rightly questioned. They are, strictly, neither ancient nor modern. They are poems grounded on oral and traditional fragments in Gaelic, blended with imitations of Homer, Virgil, Tasso, Shakespeare, and Milton; the whole being amalgamated by Macpherson with a taste, spirit, and enthusiasm worthy the aspirations of a superior genius. Homer's Iliad, and even the Odyssey, were haps compiled and amalgamated after a similar manner. character of Fingal is the finest in all poetry.

pable of being converted into other apparent bodies, but they are equally unsusceptible of being converted into each other. They are also incombustible and infusible; and they enter into the composition of all substances that fill up space, beginning with gems and ending with sand. Yet even these have frequent increase and diminution. Some minerals impart their virtues without losing any of their sensible weight; but they lose weight nevertheless. It is only insensible to us.

The diamond is the most unchangeable of earthly bodies when in its quarry; and yet this hardest of all bodies is a combustible substance, and furnishes pure charcoal; and charcoal itself, the most obstinate of bodies, may yet be melted by the gas blow-pipe.

The apparent changes in mineral bodies are exceedingly curious and beautiful. If nitric acid is poured on copper filings, the particles of copper will combine with those of the acid, and form a new body distinct from either. Mercury will dissolve in vapour at the common temperature of the atmosphere. Iron is burned by pure oxygen gas; and, when applied to a roll of sulphur, becomes obsequious and pulverizes. Gold and silver may be reduced to a calx, and afterward reclaimed to their primitive nature and form; and all bodies resolve themselves by chymical analysis into earth, water, salt, sulphur, or mercury. Shells, wherever found, will ferment with acids, and burn into lime; and limestone is formed by a combination of water, carbon, and oxygen. When a limestone rock appears, therefore, we may rest assured that water once flowed there. Indeed, the whole form and disposition of the earth would seem to prove that it was once in a state of fluidity.

Silver is generally found combined with lead, antimony, and sulphur; copper with many substances; iron mostly with sulphuric and carbonic acids; py-

rites with iron and sulphur; tin with sulphur and copper; lead with sulphur and silver. Mercury is found among ores, stones, and clay; nickel with iron and arsenic; zinc with carbonic and sulphuric acids. Of these, gold and platina are the most unchangeable. They are dissolved by oxygenated muriatic acid; silver and other metals by nitric acid: and they all burn readily in oxygen gas.

Sulphur, plumbago, and several bitumens, coal, jet, and amber, are combustible, and, therefore, freely change their forms and natures. The harder metals are combined by the force of chymical affinity, and decomposed by the same principle: a power supposed to arise from positive and negative electricity.

Some have even affected, to a degree, not only to separate the component parts of objects (the science of chymistry), but even to change one body into another. The labours of the alchymists took this direction: hence their endeavours to discover a menstruum, which, being cast upon metals in a state of fusion, would convert their true mercurial parts into gold. This menstruum they called the powder of projection. The possibility of metals being transmuted into gold was entertained by Bacon, and in some measure countenanced by Boyle and Newton. The changes of mineral bodies may be supposed to arise from a union of the combined effects of electricity, magnetism, and chymical affinity.

Paracelsus and Van Helmont took a less objectionable ground when they insisted that in nature there existed a fluid which has the power of reducing all bodies into their original elements.* The existence of such a fluid is doubtless not impossible; but it has never yet been discovered; and if it really exist, it will probably be given to accident to

* Davy affirms that elementary bodies are but few, and that even those few may, possibly, be only one under different forms.

discover. Nature has trusted no animal with fire but man: a universal solvent would, perhaps, be too powerful an agent for him to be intrusted with. The time may, however, come, when Nature will speak a more intelligible language, and intrust her observers with higher prerogatives. That time seems now, indeed, rapidly approaching; for M. Lussac has discovered means of rendering the most inflammable substances combustible without flame or fire. By the gas blowpipe rock crystal may be melted into a substance resembling pure mercury; rubies, sapphires, and emeralds may be reduced to one mass; and even magnesia and pure carbonate of lime, long supposed to be the most refractory of substances, may be melted by it. This astonishing power is derived, as Clarke has shown, from the mixture of hydrogen gas with that of oxygen gas, in the exact proportion in which they form water.* By this discovery of burning the gaseous constituents of water, all things in Nature become fusible, and in many instances even volatilizable.

Mercury is said to be the foundation of colours,† salt of savours, and sulphur of odours. Sulphur has such affinities that it is found combined not only with minerals, but with vegetable and animal substances; also with hydrogen. When combined in a state of combustion with water, it produces sulphurous acid; burning it in pure oxygen gas produces sulphuric acid.

Phosphorus exhibits another beautiful instance of change. One pound of it will melt one hundred pounds of ice. When combined with hydrogen gas, it takes fire at any temperature upon being exposed

* Two parts by bulk of hydrogen gas added to one part of oxygen gas.

† Metals in a voltaic battery burn with various colours: zinc with a bluish light, fringed with red; silver, emerald green; lead emits a purple light; copper, a bluish light with sparks; gold, white tinged with blue.

to the atmosphere ; and when associated with sulphur, it forms a compound so extremely combustible, that, on being exposed to the air, it bursts into a vivid flame.

Oxygen gas assists combustion, nitrogen gas destroys it. Fire is detected in the fat of animals, in the wax of bees, in vegetables, in flints, and in minerals ; but gold has the remarkable property of enduring its greatest power for several weeks without any apparent diminution of its weight. Fire hardens earth and softens metals, vitrifies rocks, reduces alabaster into a powder, purifies air, and evaporates water. It destroys vegetables, crystallizes, sublimes, and, in fact, seems to be Nature's most universal agent, not only of change and apparent ruin, but of fructification and reproduction.

The compression of air produces both fire and water.* Water is composed of fifteen parts of hydrogen and eighty-five parts of oxygen ; and it is so impregnated with various extraneous matters, that none can be esteemed pure that has not undergone the process of distillation. In fact, the four elements unite in a single drop of water, and all of them may be separated at the discretion of the chymist. It is decomposed by throwing into it phosphoret of lime ; while caloric forces itself in such abundance between its particles as totally to destroy its attraction of cohesion.

Muriatic acid, on the contrary, has such an affinity for water, that, whenever it meets with moisture, it assumes the appearance of a cloud ; and so great an affinity has muriate of ammonia for it, that it cannot be collected in a receiver : it is, therefore, collected over mercury. Water has great solving

* Newton observed that all bodies which possess high refractive powers have an inflammable base ; and as water and the diamond possess those powers, he predicted that both those substances would one day be proved to have an inflammable base also. Time has verified this prediction.

powers. All vegetable acids, whether obtained from mucilage, cork, balsam, bark, ripe fruits, lemon-juice, sorrel, amber, vinegar, and tartrate of potash, are soluble in it : they are also decomposable by heat. But copal, mastic, and the gluten of vegetables are not soluble in water, though they are in oil : nor is magnesia, though it exists in every kind of acid.

The atmosphere is a transparent elastic body, compounded chiefly of two fluids, intimately blended, but differing essentially in their natures. These are oxygen and nitrogen gas. Oxygen gas constitutes about one fifth, nitrogen four fifths of the whole. Oxygen may be respired, but nitrogen is destructive of respiration. Nitrogen also destroys combustion, but oxygen so materially assists it, that, when pure, iron may be burned in it. Hydrogen, formerly called inflammable air, is specifically lighter than common air, and, from its levity, rises into the higher regions of the atmosphere ; and, being extremely combustible, produces, when ignited by an electric spark, many of those luminous appearances which are seen in the heavens.

In the atmosphere reside vapours ; mineral, vegetable, and animal exhalations ; acids and salts, separated from fuel by combustion ; particles of light, and portions of the electric fluid. It is also the mansion of the winds. The clouds operate as aqueducts to convey the watery exhalations from the ocean for distribution over the land, which without them would be a total desert ; without men, quadrupeds, birds, insects, or vegetables. The great agent in this operation is heat ; for heat, having the property of insinuating itself between the minutest globules of water, expands and causes them to evaporate. The upper region of the air being the region of cold, and cold having the property of condensing bodies, in strict opposition to heat, the vapour there condenses into its former fluid state, and falls to the

earth by means of its own weight, in the more solid form of rain. But if the region into which the vapours ascend be intensely cold, they become still farther condensed, and fall in the form of hail and ice. In the process of evaporation, the saline particles of the ocean, being of a more solid and fixed nature, do not rise. The water alone rises, and becomes still more purified by the air and the heat of the sun.

Slowness of growth and rapidity of decay form two distinct features of most organized bodies. Vegetables are remarkable instances of this disproportion. The wheat, which is several months in arriving at maturity, dies, after it has reached it, in the course of a few days. There is no apparent similarity whatever between the seed and the plant. The change it undergoes is in itself a miracle.

Who, if the knowledge of these things were not familiar even to infancy, would suppose that the soft kernel in the hard concavity of a peach-stone would one day become a tree, bearing leaves and fruit? Who could have imagined that the seeds of thistles, after lying for centuries in the womb of the earth, should be revived by being turned up with a spade to light and air; should again sink into the ground by the weight of rain, and become plants more than two hundred thousand times larger than themselves? It would appear an extravagance of the imagination to assert that from a single acorn will arise a body which, when it arrives at maturity, will bear flowers in which reside more than ten thousand males and females, each sex having distinct corollas. And who that sees the Indian fig would conceive it capable of producing a tree with the power of living two thousand years; that can give sustenance to innumerable birds, and shelter, if need be, more than ten thousand men? But these and all other vegetables at length die; and at their death are consumed by fire or decomposed by

heat and water into hydrogen, carbon, and oxygen, their primitive elements. Sometimes, however, vegetables, previous to this their final change, become petrified.

Petrifications are not substances converted into stone, as many persons suppose : they are substances incrustated, for the most part, with carbonate of lime. Sir J. Mackenzie lately discovered a fossil Scotch pine-tree in the village of Pennicuik, about ten miles from Edinburgh, on the North Esk River. The strata in which the remains of this tree were found are slate clay, but the tree itself is incrustated with sandstone. There is sandstone both above and below the slate clay, but the roots of the tree do not appear to have penetrated the latter, though they reach down to it.

Whole forests, completely coated either with compact or shelly substances, are found on Kangaroo Island ; also on the continent of New-Holland. These incrustations are supposed by M. Perron to arise from decompositions of shellfish, which, transported by the winds, are deposited on the trees and plants in the form of dust, and soon become solid pellicles around the branch on which they light. This causes the gradual decay of the tree, which, yielding to the influence of the calcareous matter, disorganizes, and, after no great length of time, becomes a mass of sandstone, the arborescent form of which alone recalls to the eye of the observer its former vegetable state.

GEOLOGICAL CHANGES.

It has been beautifully said by M. Necker, "The blissful idea of a God sweetens every moment of our time, and embellishes before us the path of life ; unites us delightfully to all the beauties of Nature,

and associates us with everything that lives or moves." Thus we are led to contemplate Nature with satisfaction in all her attitudes.

The effects of volcanoes are generally known ; it is not, therefore, my intention to enter into a history of them, though we may just note a few of comparatively recent occurrence. A great part of the Passandayang, in Java, was swallowed up in 1772 with explosions louder than the heaviest ordnance. Forty villages were destroyed ; and 2957 inhabitants, and a strip of land fifteen miles in length by six in breadth, ingulfed. In 1776 the whole city of Cumana was overturned ; and in a subsequent earthquake at Caraccas, nine tenths of that city were destroyed, and 10,000 persons buried in its ruins.

Earthquakes are frequent and fatal in Peru, where entire districts are devoted, as it were, to incessant volcanic action.

Volcanoes doubtless operate as safety valves, for the want of which in many places earthquakes have occurred. In 1600 a volcano in Peru covered an area of above thirty-four thousand square acres with sand, ashes, and other matter. Bouguer seems to think, that from the multitude of caverns and volcanoes found in them, the solidity of the Cordilleras by no means corresponds with their bulk. It is curious to observe, that while volcanoes spread such wide and incessant destruction in the southern, they are totally unknown in the northern parts of the American continent. Nor have any data yet been discovered which lead to the conclusion that there ever have been any.

Java, one of the finest islands in the world, is, on the contrary, almost entirely volcanic. Dr. Horsfield visited one of the craters. " Everything," says he, " contributes to fill the mind with the most awful satisfaction. It doubtless is one of the most grand and terrific scenes which Nature presents, and afforded an enjoyment which I have no power to de-

scribe." In that island there was an eruption in 1586 which destroyed ten thousand persons. But a more extraordinary one was that of Tomboso, a mountain situated in the Island of Sambawa, in the year 1815. So extensive was this explosion, that its effects extended over the Molucca Islands, a large portion of Celebes, Sumatra, and Borneo, to a circumference of a thousand miles from its centre, by tremulous motions; and its reports were heard at Java (three hundred miles distant), and inspired as much awe as if the volcano had been there; while such showers of ashes fell upon the island as totally to darken the atmosphere. The ashes, too, lay an inch and a half deep at Macassar, distant two hundred and fifty miles. The sea was, for many miles round Sambawa, so covered with pumice-stone and trunks of trees as to impede the progress of ships; and the atmosphere was for two entire days dark as the darkest night. The air was still, but the sea much agitated. The explosions were not only heard at Java and the before-mentioned islands, but at Banca and Amboyna: the latter 890 miles distant, the former 986.

In 1783 a volcanic eruption broke out in Iceland, and for two months spouted out volumes of matter to a height of two miles, covering in its fall a tract of land to the extent of three thousand six hundred miles square. In this island volcanoes have all the dreadful accompaniments of those in Italy, but few of their benefits. In Iceland they produce no fertility; but in Italy, the fertility they occasion atones in no small degree for the previous desolation.

If we recur to earthquakes, the scene of change widens to an astonishing extent. A high mountain in one of the Molucca Islands has been changed into a lake, of a shape answering to its base; St. Calphurnia, in Calabria, and all its inhabitants, were overwhelmed by one earthquake; while by another (A.D. 1692-3), not only fifty-four towns and cities,

besides villages, were damaged or destroyed, but sixty thousand persons perished.

Not more astonishing were the effects of the great earthquake at Lisbon than the extent of its operations. It was not only felt at Lisbon and Oporto; in every province of Spain except those of Valencia, Aragon, and Catalonia; at Algiers; in the kingdom of Fez; in the empire of Morocco; in the Madeira Islands, and in those of Antigua and Barbadoes in the western hemisphere, but also in Corsica; at Bayonne, Bordeaux, Angoulême, and Havre in France; in many parts of Germany, Bohemia, Switzerland, and Holland; England, Wales, Scotland, Ireland, and Norway.

That earthquakes are of volcanic origin there can now, I think, be very little doubt; the larger shocks being the consequences of the primary impulses, the causes of which have not yet been solved; and the minor ones the results of the undulations of the strata.

There is no science, if we except Astronomy, that awakens so magnificent a conception of the Divine Power as that of GEOLOGY.

The Pythagoreans derived the greatest consolation from the ever-changing aspect of material objects; nor is there a finer passage in all Ovid than that wherein he gives a history of the natural and moral philosophy of Pythagoras.

Beattie also has a magnificent passage:

"Of chance or change, oh! let not man complain,

Else shall he never, never cease to wail.

For from the imperial dome, to where the swain

Rears his lone cottage in the silent dale,

All feel the force of fortune's fickle gale.

Art, empire, earth itself, to change are doom'd;

Earthquakes have rais'd to heaven the humble vale;

And gulfs the mountains' mighty mass entomb'd;

And where the Atlantic rolls wide continents have bloom'd."

The sea now separates Britain from France; Sicily from Italy; Terra-del-Fuego from Patagonia;

Sumatra from Malacca; Haman from Quantong; Ceylon from the Carnatic; and the Island of Madagascar from the Continent of Africa. It is more than probable that all these islands were separated from the mainland by some vast convulsion of Nature. Herodotus even conjectures that all Thessaly was anciently a lake; while Pallas conceives that, in remote times, the Crimea was an island, and that the Black Sea surrounded it.

Whether America was really separated from Asia, or whether the two continents actually joined, we can never know. But such a union would be no more extraordinary than that subsisting between Asia and Africa at the Isthmus of Suez. The points which mark the two hemispheres are flat, and the sea more inclined to shallowness than depth. Volcanic matter has been found on the shores of Behring's Straits; and it has, therefore, been reasonably conjectured that the two continents may have been formerly connected. Earthquakes are frequent in Kamtschatka; and some terrible visitation of that nature may have rent asunder the isthmus that united them.

That the sea once covered the earth is clearly established by bones of animals, petrified fishes, strata of shells, and beds of vegetables under those marine substances, having been found in many countries in situations much higher than the sea, and not unfrequently on the sides and even summits of mountains. Some mountains in Chili are formed entirely of shells, few of which are in a state of decomposition; and on the Descaheydo, one of the Andes, not much inferior to Chimborazo, are oysters and periwinkles, calcined and petrified.

Bivalve shells have been also found on Mount St. Julian in Valencia, enclosed in beds of gypsum, surrounded by detached pieces of slate; petrified marine substances in a mine of native mercury in a steep hill near San Felipe; and in a white crag of

marble on Mount Olympus, petrified fishes three hands long and three fingers broad, with their gills clearly discernible.

Though shells have been in all ages observed to be component parts of mountains, Bernard Palassy was the first who asserted them to be real shells, and that they had once been inhabited by fishes; and he defied the schools of Paris, and all the arguments of the followers of Aristotle, to prove the contrary. These beds of shells are discovered in positions sometimes horizontal, sometimes undulated, and sometimes vertical; and so thick as not only to check, but totally prevent vegetation. They are frequently divided into strata, the lower one consisting of shells unlike those now found in the sea, the upper resembling those generally known.

On the clefts of the calcareous rocks of Gibraltar* are found breccia, penetrated with bones of carnivorous and herbivorous animals. Indeed, many rocks in Spain appear to be almost entirely composed of river and oceanic shells, mixed with bodies beneath other rocks in beds of blackish earth. Even *cornua ammonis*, which are natives of very deep oceans, have been found in elevated regions.

Large masses of sea-shells have also been found on the surface of plains in several parts of Asia, and groups of tall trees under the great basin near Calcutta; at Dum-dum, not only trunks of trees, but the bones and horns of deer in a soil of great depth. Fossil bones of deer have been discovered, likewise,

* Cuvier has some curious remarks on the osseous conglomerate, or breccia, found in the limestone rocks and hills of Gibraltar, Cete, Nice and Antibes, Corsica, Dalmatia, Cerigo, Conced in Aragon, and in the Vicentine and Veronese districts. Upon these phenomena he remarks, that the osseous breccia, not formed by a tranquil sea or by a sudden irruption of it, are posterior to the last resting of the ocean on our continent; that the well-ascertained bones belong to herbivorous animals; and that the greater number belong to animals now existing in the neighbouring country.

in a deep bed of gravel on the Kylas Mountain, or of the Himalaya range, 16,000 feet above the sea: Fossil muscles and other shells have been found also, at nearly the same height on calcareous rocks strata of granite, and pulverized schist.

On the Missouri the back bones of a fish forty-five feet long, in a petrified state, are found; as have been bones of the mammoth in soil not above six inches deep, in Orange County, sixty miles from New-York. From the anatomy of these bones, the animal to which they belonged seems to have been larger than the elephant; and it has therefore been called the great mastodon. Among the rocks between the Zand and Orange Rivers, northwest of the Cape in Africa, petrifications of shells* are seen, some of which lie in situations one hundred and fifty feet above the level of the sea. And as a still farther corroboration of some vast change, it may be remarked, that in many places where pebble strata have been examined, some have been found broken, whose pieces lie very near each other: a circumstance which proves to demonstration that at some distant time they must have suffered a violence which broke them into separate pieces, and in the very places, too, in which they have been found.†

* "It must appear almost incredible to those who have not minutely attended to natural phenomena, that the microscopic examination of a mass of rude and lifeless limestone should often disclose the curious fact, that large proportions of its substance have once formed parts of living bodies. It is surprising to consider that the walls of our houses are sometimes composed of little else than comminuted shells, that were once the domicile of other animals, at the bottom of ancient seas and lakes."—BUCKLAND.

† It is curious that Linnaeus, having a knowledge of these circumstances, should assert that he perceived many vestiges of a former world, but none of a deluge! But Cuvier, the Newton of this science, says, "I am of opinion with M. Deluc and M. Dolomieu, that if there is any circumstance thoroughly established in geology, it is, that the crust of our globe has been subjected to a great and sudden revolution, the epoch of which

Shells are often discovered in English clay-pits, among which are the *conchæ anomæ* and the *nautilus Græcorum*, materially altered from their original state by being impregnated with stone and clayish particles; and near Wakefield, in alluvial soil, shapes of muscle-shells in a fossil state, lying in a stratum of black limestone. The marbles and limestone in the neighbourhood of the caves in Yorkshire are described as being made up of testaceous and piscaceous relics; and some have even supposed that all the chalks, marbles, gypsums, and limestone of this kingdom are formed of marine shells and animals: an idea once scarcely to be credited; and Hutton extends it even to the supposition that the earth is in a great measure composed of the exuvie of marine animals. Dr. Fisher, on the other hand, believes that the shells thus discovered are real stones; and the plants, stone plants, formed after the manner of figured stones; and Misson inclines to the probability that these shells never contained animals, but were generated where they now are, in the same manner that chalks and other substances are; a position contradicted by all the rules of analogy and experience, as well as by the certainty that the veins of coal, called coal-pipes, were originally small branches of trees.

Coal-pits and slate-quarries frequently exhibit impressions of vegetable substances. Even the trap-

cannot be dated much farther back than 5000 or 6000 years ago; that this revolution had buried all the countries which were before inhabited by men, and by the other animals that are now best known; that the same revolution had laid dry the bed of the last ocean, which now forms all the countries at present inhabited; that the small number of individuals of men and other animals that escaped from the effects of that great revolution, have since propagated and spread over the lands then newly laid dry; and that the countries which are now inhabited, and which were laid dry by this last revolution, had been formerly inhabited at a more remote era, if not by man, at least by land animals."

rocks of Sweden are evidently of aqueous formation, impressions of ferns and fishes having been discovered in them. On the Ohio are found leaves, insects, and marine shells mixed in limestone; in the caves of Green Briar, in Virginia, the bones of the *megalonyx*; and in the alluvial soil of Teneriffe clayey calcareous tufa, containing similar imprints. Trunks of palm-trees have even been thrown out of volcanoes; and in the fissure of a lead-mine at Pontpian, near Rennes, a beech-tree was discovered among a few sea-shells, the centre of which had been converted into coal, the bark into pyrites, and the sap-wood into jet.

In Touraine there are 130,680,000 cubical fathoms of shells, unmingled with either stone, sand, or other extraneous matter, thirty-six leagues from the sea. The farmers manure their land with them. The environs of Paris afford, too, many striking phenomena. The antiquities of Palmyra, Persepolis, Babylon, Memphis, and Thebes, are striking objects for the contemplation of man. But those of Montmartre, in the neighbourhood of Paris, are much more so, when our reason has leisure to think of them as they deserve. The former speak eloquently in regard to the vicissitudes of empires, but the latter speak no less eloquently in regard to the antiquities and vicissitudes of our globe. Here bones of unknown animals occupy whole districts, near which lie remains of animals, now natives of other climates; and vast collections of marine exuviae have been discovered, in the immediate neighbourhood of which shells of fresh-water fish are deeply imbedded.

I. The first formation is that of chalk, in which are unconnected flints disposed in beds. There are also organic remains, of which twenty-two species have been described by Cuvier and Brogniart. II. This stratum of chalk is covered with a bed of plastic clay, containing no calcareous, but some silicious

matter. It is, in some places, seventeen yards thick, in others not above three inches. III. The stratum that succeeds is composed of coarse limestone, sometimes separated from the clay by a bed of sand. In this formation have been found six hundred species of fossils. These have been described by De France and De la Marck. IV. The fourth stratum consists of silicious limestone, lying parallel with the above; but no organic substance whatever has been discovered in it. V. Lying upon the silicious limestone is a formation of alternate beds of gypsum and of calcareous and argillaceous marls, in which have been discovered scattered bones, and entire skeletons of unknown birds and quadrupeds, and a few shells, evidently of a fresh-water kind. A little above these remains have also been found the bones of a tortoise and of a crocodile; of a Parisian opossum; five species of *paleotherium*; five of *anoplotherium*; a species of hog, and of a Parisian dog; a few fishes, and four unknown species of birds. VI. The sixth formation is of marl, in which have been discovered, not only the remains of shells and fishes, but of a palm-tree; and immediately above these, in marl of marine origin, twenty-six species of fossil remains. VII. The seventh stratum consists of sand and sandstone without shells, over which is found—VIII. Sandstone, containing objects of marine formation, sixteen of which have been described by French geologists. IX. Is of buhr, used for millstones. X. Consists of marl and buhr-stones, in which are found shells belonging to rivers and lakes, with twenty species of seeds, reeds, silicious wood, and other vegetable substances. XI. The eleventh formation is a stratum of what is technically called “travelled earth;” consisting of marl, rounded pebbles, pudding-stone, clay, sand, gravel, and peat-moss. In these substances are trunks of trees, and the bones of oxen, reindeer, elephants, and other large mammalia.

Upon minute investigation, Cuvier* ascertained, that of the fossil remains, comprising seventy-eight different quadrupeds, forty-nine are of species distinct from any known to naturalists of the present day. Eleven or twelve species are now known, and sixteen or eighteen belong to others bearing considerable resemblance to known species. He ascertained, also, that the remains of oviparous animals are found in more ancient strata than those of the viviparous class. From these data it would appear that, in the formation of 196 yards, being the depth from the top of the eleventh to the lowest point of the chalk, there have been no less than ten geological epochs, in which the sea appears to have twice covered that part of the globe, and twice retired from it.†

Leaves of trees, trunks of bituminous wood, vast quantities of shells, with bones of fish and other marine animals, are perpetually found among the Sub-Apennines of Italy. At the feet of the Ligurian Mountains is a tract of breccia, agglutinated scales of mica, and pieces of quartz, in which are imbedded shells, bivalve and univalve, and a profusion of madrepores. Similar organic substances have been

* Cuvier, by establishing a correct classification according to their nature, has effected that for the animal kingdom which Linnæus and Jussieu have done for the vegetable one; given us a knowledge of animals existing before the present disposition of things, and also a key by which, from the examination and contemplation of a fossil tooth, we may not only, by that slight indication, know the class and order to which it belonged, but even the prominent character of its nature.

† "Geological science proves to demonstration that God makes use of ages, perhaps of millions of years, to produce effects that one simple *instantaneous fiat* might effect. Hence we learn that there is a slow and successive development in the schemes of his providence; and hence a hope is excited, a vivid and animating hope, that this is his mode of dealing with individual man, and that it is the way in which he rears the highest faculties of his nature for an interminable growth and eternity of increase."—FELLOWS: *The Religion of the Universe*, p. 56.

discovered on the Superga, near Turin, two thousand and sixty-four feet above the level of the sea ; and along the Apennines overlooking Modena, Parma, Piedmont, and Placentia. In Modena, the waters of the wells spring from beds of gravel mixed with marine shells. These shells are found more than sixty feet in depth, and yet more than one hundred and thirty feet above the level of the Mediterranean. The shells thus found have a general analogy with each other, though many of them belong to species long supposed to be natives of other oceans. Subsequent investigations, however, have proved that many of those shellfish which have for ages been supposed to belong only to the Indian, African, and Northern Seas, the insulated recesses of the Caspian, the bays of Nicobar, and the coasts of South America, are not only to be found in the neighbourhoods of Naples and Ravenna, but, as above described, imbedded in strata of blue marl, in the bosom of the Sub-Apennines, sixty feet below successive strata of black earth, mixed with vegetable substances.

On a hill, distant about twenty miles from Verona, are found stones disposed in slates, which, being split, discover in each the half of a fish. Its species is known by the head, the eye, the spine, and the tail. Many of these were preserved in the collection of Vincenzio Bozza of Verona, who formed a collection of petrified fishes, taken from Mount Bolca, some of which the Abbé Fortis identified with fishes on the coasts of Otaheite. The borders of Mount Baldo, on the Lake Du Garda, exhibit large pieces of grayish marble full of sea-shells, converted into a substance of white spatha ; near the sanctuary of Corona are flints mixed with fragments of star-fishes ; and on the side of the Altissimo marks of fishes in calcareous stone. Entire skeletons of animals, supposed by some to be whales, have been dug up in Tuscany, Bologna, Piedmont, and Placentia, out

of strata of blue marl. Indeed, so many of these fossil remains have been found in the Superiore Valdarno, that Targione called it "the Cemetery of Elephants." In this district also have been found bones of rhinoceroses and hippopotami, as well as near Leghorn, Viterbo, Verona, Rome, Naples, and in Calabria.* They lie, for the most part, not more than a few feet below the surface; but in one instance, near Rome, those of the elephant are imbedded twenty feet deep in volcanic tufa. Some of those found so near the surface of the earth may, however, have been buried by the Romans, who were accustomed to collect great numbers of Asiatic and African animals for their savage exhibitions.

Those dug up in Valdarno Superiore and near Placentia were incrustated with oyster-shells, which adhered so closely to them that to break the bones was to break the oyster-shells at the same time. But it is probable that, as these bones are found among marine shells, they are really not the bones of elephants, but of some marine animals resembling them in anatomy.

It is to be observed, that the fossil shells found near Paris are for the most part totally distinct from those of the Sub-Apennines.

The ruins of Agrigentum stand upon a mountain composed of a concretion of sea-shells as hard as marble; and a stratum of bones has been found in Istria and Ossaro, under rocks of marble forty feet in thickness. Marble itself, also, has been found in Egypt, Italy, and Scotland, in which sea-shells are compactly indurated. Elephants' teeth, too, have been dug out of a marble quarry in Saxony, and

* Immense beds of bones have been found between the mouths of the Lena and Indigerka,* of mammoths, buffaloes, and rhinoceroses; vast multitudes are also seen in the caverns of the German mountains.

* See Von Wrangell's Expedition to Siberia and the Polar Seas, Harpers' Family Library.

are preserved in the Royal Museum of Copenhagen. These marbles were doubtless once of a soft nature like mud, and have become hard by the retirement of the water.

Sea-shells are found in Peru, more than 10,000 feet above the waters of the ocean; and on the summit of the mountains of the Arsagar are seen the bivalve shells of the Caspian. Thus, while fossil shells have been discovered in the quarries of Flanders, and among the Alps behind Genoa, the Pyrenees, the Caucasus, Athos, Lebanon, Ararat, the Riphæan ridge, and the steep mountains of New-Ireland, the Andes present strata, either of shells, seaweeds, or skeletons of fishes, amphibia, and other animals, not only at their feet, but in their girdles, and near their very summits. Indeed, multitudinous are the evidences, in almost all parts of the globe, that what is now dry land, quarry, rock, and mountain, have, at separate periods of time, been in a state of liquidity.

The formations to which the Parisian strata apply were made at different epochs of time; each stratum was once the surface of that part of the globe in which it is now situated, and the animals found imbedded, there lived and there perished. It is indeed said that some species lie in a stratum which extends several hundred miles, unmixed with the other strata above or below. Now this is very possible, and there ought to be little doubt as to the fact; but we are no more to apply this comparative greatness of extent to the whole globe, than the natives of the deserts of Asia can be allowed to insist that, because deserts cover vast tracts, therefore deserts pervade the entire surface of the earth.

Strata containing vegetable remains seldom discover marine shells or bones. Little, however, can be inferred from this, the whole subject being wrapped in ambiguity. It is probable that each species of

nomena peculiar to itself; and, therefore, it is no great stretch of reasoning to suppose that the whole has several times been peopled with animals and vegetables different from those now in existence.

ASTRONOMY.

Is it possible to travel where Nature does not speak to us? If we coast the shores of the Mediterranean, or behold the sun setting in unclouded majesty in the Adriatic; if we inhale the temperate breezes of the Levant, or drink the odours wafted by the winds over the Arabian Sea; if we measure the vastness of the Pacific, encounter the snows of the Northern, or the ices of the Antarctic Ocean, still do we behold Nature operating on one grand uniform plan, her laws everywhere fixed, her bounty everywhere munificent.* Scenes like these create the most enlarged ideas of that infinity in which the Eternal centres; in whom it originates, and to whom it is alone reserved to calculate its boundless measure. Extension being one source of the sublime, the science which most expands our faculties of comprehension is undoubtedly that which is in itself the most noble and transporting. Nothing, therefore, can more strikingly indicate the vastness of those powers which Nature has implanted in man, than the faculty of investigating the various branches of natural philosophy, and, above all, that most wonderful of all the sciences, ASTRONOMY: the science of devotion, the science of an awful silence.

As the poet gazes upon the evening star, he is re-

* It is the same handwriting that we read, the same system and contrivance that we trace, the same unity of object, and relation to final causes which we see maintained throughout, and constantly proclaiming the UNITY of the great divine Original.
—Buckland's *Inaug. Lect.*, 1819, p. 13.

mind of the fate of Hesperus, who, journeying up Mount Atlas to observe the motions of the planets, and never returning, was fabled to have been transformed into the star of evening. When the eye glances over the group forming Cassiopeia, we think of that splendid star which was seen in its arena in 1572, with a size and brilliancy equal to Jupiter, and which gradually disappeared in eighteen months, having, during that period, been an object of astonishment and terror to every part of Europe. As we watch in the middle of August for the emersion of the Dog-star from the rays of the sun, we reflect that from the rising of this, the largest and the brightest of the stars, the Egyptians and Ethiopians calculated the beginning of their year. When Arcturus ascends in the hemisphere, we listen in imagination to the lyre of Iopas, singing the causes of the sun's eclipses, the varied motions of the moon, whence proceed showers and meteors, whence the rainy Hyades, and whence the bright Arcturus. While we contemplate an eclipse, we behold in it an image of the gigantic yet ruined form of the lost archangel,

" Proudly eminent,
Standing like a tower !"

As we mark the rising of a comet, the imagination wings into the infinite regions of space, or we dwell on the mortal combats with which the world has been desolated—on Cambyzes in Ethiopia ; Alexander in India ; Brennus in Greece ; Attila in Italy ; Odin in Scandinavia ; Cortez in Mexico—all, to the astonished nations they invaded, seemed like comets, which

" From their horrid hair
Shake pestilence and war !"

What were the awful raptures of a Galileo, a Descartes, a Copernicus, or a Newton, no one but those conscious of a flight as soaring are capable of con-

ceiving. But from the feeblér impulse of an humbler mind, I am persuaded, my Lelius, that they assimilated in a much higher degree than ourselves with the Eternal mind. I have ever felt an intense delight in the cultivation of astronomical science; but I am ready to confess that, after venturing into the ocean of infinity, I desisted for some time out of pure cowardice. Satellites, planets, and suns hanging on their centres in the arched void of heaven by a single law; and systems, connected to each other by the revolution of comets, all floating in the boundless inane, were too overpowering, too mystic and magnificent for a mental ray so limited as mine.* Passing the bounds of place and time (*flammanitia mania mundi*), I could glance from earth to heaven, and give to the various orbs their various appellations, and calculate their courses. But when I began to perceive that the work of creation is always going on; that the alteration of one system produces the germination of another; that though light travels with almost incredible swiftness, there exist bodies which, from the immensity of their distance, have not yet visited the eye of the astronomer; when I began to perceive that even were it possible to transport myself to the most distant of those orbs which are unmeasured suns to immeasurable systems, I should still only be standing in the vestibule of Nature, imagination ceased to have power to soar, feeling became painful, and the faculty of thought, by too great extension, seemed lost, and scattered into nothing.

Some one inquiring of Anaxagoras for what he

* "The progress of astronomy," says Laplace, "has been the constant triumph of philosophy over the illusions of the senses." In some studies the imagination can supply what is wanting to perfection: in astronomy, imagination is in itself nothing: it is, as it were, less than nothing. Those stars which are observed to roll round other stars, must be suns rolling round suns; for were they merely as planets are to our sun, it is evident they could not be seen at all.

was made, he replied, "To contemplate the stars." All great poets, too, have turned their eyes with admiration to the heavens. Hence we have so many astronomical allusions in Scripture, in Homer, Hesiod, Theocritus, Virgil, Horace, Lucan, and Silius Italicus; Tasso, Shakspeare, and Spenser.

Proclus declares that the heavens subsist terrestrially, and the earth celestially; thereby implying that the earth and stars are of the same nature. In the hymns of Orpheus, too, the same sentiment is implied; and who in this connexion is not reminded of that fine passage in Akenside?

" Ere the radiant sun
Sprang from the east, or mid the vault of night
The moon suspended her serene lamp,
Ere mountains, woods, or streams adorn'd the globe,
Or Wisdom taught the sons of men her lore,
Then lived th' ALMIGHTY ONE."

What life so delightful as that passed in investigating the laws, analogies, and resources of Nature? and yet many astronomers measure motions, distances, and magnitudes as seamen compute their logs, or architects measure their domes and columns—with no poetry, no enthusiasm! Far different, however, is it with others, who behold a present Deity in every movement of the vast machine. To them all things present the sublime effects of Divine workmanship; where the splendour of the materials yield to the surpassing power and skill of the architect who moulded them into form and gave them motion.

At Athens Astronomy was persecuted; at Rome, not only neglected, but almost despised; at Alexandria, cherished. In modern times it has been successively persecuted, tolerated, and cultivated, but seldom greatly patronised. To whatever age, however, we direct our view, we behold astronomers removed from ordinary men; less subject to violent passions, less devoted to worldly interests; more

alive to moral beauty, and more sensitive to the splendour and magnificence of elevated actions.

The Stoics, who were ignorant of the power which electricity possesses of giving life, as it were, to the elements of matter, resolved air, earth, fire, and water into each other; and as magnetism is said to have the property of suspending gravitation, so they imagined (as Nature delights in circles and ellipses) that there existed a power which controlled the progress of events, and which, after a certain era, caused them to revert into their respective original channels; as water is resolved into vapour by heat, and vapour back into water by cold; so that every event was supposed to be bound perpetually to recur; the same number and description of plants, insects, birds, and other animals again to animate and adorn the earth; and the same beings, subject to their prior passions, again to exercise the same virtues and vices, and to be liable to the same calamities and disorders as in their antecedent state.

This opinion was maintained by the Brahmins and Egyptians, and is still entertained by the modern Siamese. Plato and Virgil admitted it, with some modifications. It is implied in Boëthius's Consolation of Philosophy, and is fully described in the Dabistan. The period of revolution is said to close, and another to begin, when all the planets are in conjunction; alternately in the signs Cancer and Capricorn;* at which times new impulses are

* The Druids believed in these periodical changes, which were sometimes to arise from the power of fire, and at others from that of water. Cicero entertained a similar belief, as well as Seneca; and Berosus taught, that when all the planets meet in Cancer, the world is changed by a conflagration; when in Capricorn, by a deluge.

Nicias believed that the sun in the space of eleven thousand years had changed his place of setting from east to west, and from west to east. Some have taught, that in 12,960 years the north pole will be viewed as the south pole, and that in 25,920 it will again revert to the north.

supposed to be given, and new circuits to commence. Darwin, in the following passage, seems to have imagined that all the planetary bodies would be drawn into one vortex, and thence emerge after revolutions of certain periods :

" Roll on, ye stars, exult in youthful prime,
Mark with bright curves the printless steps of time ;
Near and more near your beamy cars approach,
And lessening orbs on lessening orbs encroach.
Flowers of the sky ! ye too to age must yield,
Frail as your silken sisters of the field !
Star after star from heaven's high arch shall rush,
Suns sink on suns, and systems systems crush ;
Headlong, extinct, to one dark centre fall,
And Death, and Night, and Chaos mingle all !
Till o'er the wreck, emerging from the storm,
Immortal Nature lifts her changeful form ;
Mounts from her funeral pyre on wings of flame,
And soars and shines another and the same !"

The Jews believe that when the world has attained the age of six thousand years, there will be an eternal Sabbath.* Newton appears to have entertained the idea of a complete period, and the beginning of a new era,† so far as to suppose that the

Ptolemy, Tycho, Riccioli, and Cassini believed our system to have a fixed period of career, varying from 24,800 years to 36,000 ; Copernicus to 258,000. It has been calculated, that from the time in which Mercury, Venus, the Earth, Mars, Jupiter, and Saturn are next in conjunction, they will be in conjunction again after a period of 280,000 years ; after having made the following revolutions :

Saturn	9,516
Jupiter	23,616
Mars	148,878
Earth	280,000
Venus	456,122
Mercury	1,162,577

* This prophecy is received from Elias the Cabalist: two, two thousand years before the law; two under the law; and two immediately under the guidance and protection of the Messiah.

† The Scandinavians believed in the destruction of the world, which they called the "twilight of the gods," and in the reno-

fabric of the universe cannot subsist forever without being renewed by the hand of the Creator. This idea was started by Hipparchus immediately upon discovering the precession of the equinoxes. Timæus, on the other hand, insisted that the universe was perfect in beauty, and that it would never stand in need either of correction or renewal: and this opinion has of late years been confirmed by the splendid discovery of La Grange, and the masterly calculation of La Place, proving that all the planetary movements, whether regular or apparently irregular, are periodical.

It is remarkable, that though we see change to be the law of our globe, yet in the heavens all appear to the naked eye to retain unvarying aspects. The sun rises and sets; the moon exhibits her periodical phases; planets perform their stated courses; and their satellites undergo their respective series of eclipses. On earth every object has its period of decay; but the planets and the fixed stars seem formed for unchangeable duration. And though there are portions of the heavens, particularly in the southern hemisphere, attesting ample space for new creations, yet no new creations are observed to take place.

But the monotony observable to the unassisted eye, is not monotony in reality. Nature withdraws not her veil while she is teeming. She never dies,

vation of it. Then would spring into existence another universe of a far more perfect formation; another earth, springing from the cause of causes; emerging from the bosom of the ocean, rolling in the blue expanse, and producing by a voluntary impulse every description of flower and fruit.

This renovation was believed in, also, by the ancient Brahmins, the Chaldeans, the Egyptians, and the Persians. Orpheus brought the doctrine into Greece, and Pythagoras transplanted it into Italy. Chrysippus called it *apocastasis*; Marcus Antoninus, *palingenesia*; and Numerius, resurrection and restitution. The natives of Pegu likewise believe in an eternal succession of worlds.

nor ever waxes old. Ever various in the midst of simplicity in form and colour; ever active even in the midst of apparent repose: the glass of the astronomer discerns globes or bodies wearing the appearance of recent formation: how large, Uranus, Saturn, Jupiter, and the sun* may assist us to imagine; how small, Venus, Mercury, and the Asteroids.

Changes, too, in other instances, are evident to the eye of philosophy. The rings of Saturn vary in breadth, and are sometimes even invisible; the belts of Jupiter and the zones of Mars have motions, and are variable; the moon has its volcanic eruptions; and the sun has spots so large that they are visible to the naked eye,† and sometimes so numer-

* Some of the fixed stars are supposed to be as large as the entire area occupied by the solar system; but the fact is, no real datum exists on which to conjecture with anything like accuracy; and the only chance likely to afford any will be the discovery of a parallax, and the quantity of light each star affords, compared with that we receive from the sun. Several stars appear to have changed their magnitude; but this phenomenon is easily accounted for by the supposition that, being in motion, they are more distant from the earth at one time than at another.

† Spots on the sun are said to have been first discovered by Galileo or Scheiner. They are not difficult to be accounted for. The sun is a solid, dark body, surrounded by an atmosphere in which clouds of a luminous nature are floating. The spots, then, are no other than breaks in these clouds, viz., spaces through which parts of the real body of the sun are visible. In Dec., 1823, Brioschi of Naples observed a spot equal to one and a half of our globe. In 1824, Pastorff of Frankfort noticed spots like eggs, with penumbæ, which he says he could ascertain to be on the surface of the solar globe. May 26, 1825, M. Pons observed numerous white spots, and one surrounded by a penumbra like Saturn's ring. May, 1828, there were 22 or 23 spots visible at the same time.

Some have imagined that these spots may become so numerous as to hide a great part of the face of the sun; and to this is ascribed the circumstance alluded to by many of the Roman poets and historians, viz., that in the year of Julius Cæsar's assassination, the sun's light was so faint that it might be gazed upon steadily with the naked eye; and Procopius says, that du-

ous, that fifty may be seen at the same time. These do not move parallel with the equator, nor have they equal velocities. Many of what we call fixed stars, too, have motions and periodical variations in their lustres and apparent magnitudes.* There are many stars known to ancient astronomers now invisible,† and others are now visible which were not so formerly. Some have appeared only for a short time, and some have gradually increased in brilliancy as others have gradually decreased.‡

Several stars have appeared, and subsequently

ring the reign of Justinian the sun for a whole year shone with an intensity not greater than that of the moon.

* The variable star in the Whale has a period of 331 days; that in Perseus two days; Leo, 311; Virgo, 146; Hydra, 494; North Crown, 335; Hercules, 60; Sobieski's shield, 60; Lyra, 6; Antinous, 7; Cygnus, 47; Cepheus, 5; Aquarius, 382; the Serpent, eleven months: I have not stated the hours. In most of these the increase of light appears to be more rapid than the decrease. Dr. Herschel justly remarks, that dark spots on large portions of their surfaces, less luminous than the rest, turned alternately in certain directions, either towards or from us, account for all the phenomena of periodical changes so satisfactorily that we need look for no other.

† The following stars, with some others, are no longer to be seen: 55, 71, 80, 81, Hercules; 56, Cancer; 62, Orion; 19 and 34, Berenice's hair; 19, Perseus; 108, Pisces; 8, Hydra.

These have undergone some mighty change, or, what is more probable, they have rolled into the depths of space, to return in their regular periodical times.

‡ Whence the stars derive their light is the most difficult of all inquiries. Newton believed that all the systems of the fixed stars mutually impart light to each other, receiving it in the first instance from some unknown source in the universe. It is probable, however, that the light of each system may differ from that of our own; since the more a telescope magnifies, the less the stars appear;* which is not the case with planets. Did they shine by the same light, they would be as invisible to the naked eye as the satellites of Jupiter are; for these satellites appear larger, when viewed with a good telescope, than do the largest stars.

* This, however, is not invariably the case, some small stars being distinctly increased by an increase of magnifying power.

disappeared; in Cassiopeia,* in Serpentarius,† in the neck of the Whale, in the head and breast of the Swan, in Andromeda's Girdle, in Leo, and in Argo. Montaner asserts that he had observed more than a hundred changes in the fixed stars, and modern science supports the assertion.‡

The solar system, vast as it is, gives place to binary, ternary, and other systems, traced in the heavens, in which two, three, or more stars are formed into one system by the laws of attraction, all revolving round one common centre.§ But to trace these, and to extend the whole to a consideration of the various nebulæ observable in the heavens, would occupy more space than the plan of this work admits.

THE GREAT—THE LITTLE.

NATURAL THEOLOGY is the most elevated and sublime, therefore the most delightful of all human stud-

* This star was so large as to appear like Venus, and was visible in the daytime. It continued sixteen months, when it gradually dwindled, and at last disappeared in March, 1573. During the whole time of its being visible it never seemed to change its place. It is supposed to have appeared, also, about the years 1264 and 945.

† Discovered Sept. 30, 1604, by Kepler. It broke out with great lustre, and was every moment changing its colour. It surpassed Jupiter in magnitude. It ceased to be visible in Jan., 1605, and has not since been seen.

‡ Though the naked eye discovers only six stars in Pleiades, the astronomer sees 188, and 2000 in Orion; whereof twelve comprise the single star in the middle of his sword, and 28 the nebulous star in his head. The nebulous star, *Præsepe*, consists of no less than forty. And how vast the multitude in the various strata of the heavens may in some measure be conceived from the circumstance that 116,000 stars passed over the field of Herschel's telescope within one quarter of an hour!

§ Their periods of revolution vary from 19, 22, 22, and 46 years, to 342, 375, 708, 1200, and 1681 years.

ies ; for it embraces all that can be seen, felt, imagined, and reasoned upon, its empire being the universe both of matter and mind.

The phenomena presented by nebular appearances give us the best, and, indeed, the only idea we possess in regard to the first condition of the material elements that compose a system of stars. When we meditate on the comparative diameters of Uranus, Saturn, Jupiter, and the sun, we are astonished ; but our curiosity is much more excited by the diminutive proportions of the Asteroids.* They best suit the limited compass of our understanding. Man most admires the great, but best loves the little.

Admirable as the structure of the larger animals undoubtedly is, I cannot but think that the elegant disposition, the minute mechanism, and the perfect adaptation of parts distinguishable in the smaller creations of Nature, are even still more astonishing to the judgment, and fascinating to the imagination. And this reminds me of what Galileo said to one who thought the Medicean stars too small to engage the attention of philosophers. "No," answered Galileo, "they are the works of God, and may, therefore, well be considered as sublime subjects for the study of man." "We admire the tower-bearing shoulders of elephants," says the elder Pliny, "and the necks of bulls, the roarings of tigers, and the manes of lions ; but Nature is never more complete than in her smallest animals."

I admire insects, too, the more since they exhibit three separate stages of existence ; those of larva,†

* A vast number of falling stars or meteors have been seen radiating from the point γ Leonis. Arago thinks that, besides the large planets and satellites, there are myriads of small bodies which are not visible, except when they penetrate into our atmosphere, where they become visible from taking fire. "Some of these Asteroids," says he, "move in a certain sense in groups, and others are insulated."

† Caterpillar, grub, maggot.

pupa,* and imago.† They typified, therefore, among the Greeks, "*Non omnis moriar*," answering to the motto of "*Resurgam*" on modern escutcheons.

All the sciences illustrate each other; and though the analogy may not be apparent to an untutored eye, there is, beyond all reasonable doubt, a relation, not only between a grain of sand and the most distant planet of the universe, but between the highest intellectual being and the smallest infusoria in what may be figuratively styled the infinite little.

The telescope has one great superiority over the microscope. The latter chains us, as it were, to the earth, while the former carries us far beyond. The microscope, however, exhibits almost as wonderful phenomena in a drop of water as the telescope does in all the heavens. The telescope displays myriads of suns, but no visible living matter; whereas the microscope unfolds myriads of animated beings in a globule, endowed with parts and organs as curious as those of an eagle, an elephant, or a man.

"Each secret spring, each organ let us trace:
They mock the proudest art of human race!"

Exquisitely minute as some animalcules are, they have numerous stomachs, distinct vision, and acute taste; and so wonderfully formed are they, that 80,000 extremities have been counted in a peculiar species of sea-star; 27,000 lenses have been counted in the eye of a dragon-fly; and 500,000 infusories have been counted (by means of a micrometer) in a globule of water; and so universal are they, that there is not a spray of the sea, a drop of rain, of vegetable or even of animal fluid, that is not crowded with them.

Magnitudes are all relative. Who does not feel the size of the earth on which we tread? And yet so small is it in the general scale of the universe—an area

* *Chrysalis*, aurelia, nymph.

† Perfect animals.

“Without bound,

Without dimension, where length, breadth, and height
And time and place are lost”—

that by no instrument yet invented has man been able to detect that one point of the earth is nearer or more distant from what are called the fixed stars than another! We, in fact, occupy a speck in the universe not larger, comparatively, than a grain of sand: whence,

“Sinking to earthly from ethereal things,”

we must often be brought to admit that the infinitely little can no more be conceived than the infinitely great. The largest body yet contemplated by man is a star, supposed to occupy a place larger than that embraced in the entire solar system! The smallest animal is even of less dimensions than those presented by infusoria: one species of which (*monas termo*) has a body, the diameter of which is only $\frac{1}{80000}$ of a line; and the thickness of the skin of its stomach is calculated to be at from only $\frac{1}{100000}$ to $\frac{1}{300000}$ of a line!*

Whether matter can be infinitely divided has been in all ages a subject of discussion. I am inclined to suppose it can be; for as every substance has necessarily an upper side, it must, by the same necessity, have an under one. Having two sides, the one can, of course, be divided from the other.

The larger the system, the more wonderful is the appearance of *power in the architect*; the finer and more minute, the more delicate and more exquisite the *skill of the designer*. Everything, in fact, proves

* Their powers of reproduction, also, are so great, that from one individual 1,000,000 were produced in ten days; on the eleventh day, 4,000,000; and on the twelfth, 16,000,000.—Vid. BUCKLAND: *Bridgewater Treatise*, i., 446. In regard to the number of animals in a given space, it has been calculated that in a space of sea, in the arctic regions, of only two miles square and 250 fathoms deep, there are marine animals amounting to 23,888,000,000,000!

an Intelligence capable of adapting means to ends ; and equally astonishing with the objects beheld are the life and thought by which they are perceived.

PLANETS IN A PROGRESSIVE STATE.

I GAZED for a long time, the other night, upon **SIRIUS**, the brightest of all the stars ; once counted among the red stars, now among the white ; of a size 324 times that of a star of the sixth magnitude, and supposed by Wollaston to throw out a light more than equal to fourteen suns : doubtless, too, accompanied by a community of satellites.

If we read Plutarch's Essay on Isis and Osiris, we shall discover that some of the ancients believed that spirits fell by degrees, not, as Vulcan did, from heaven—

“ From morn to noon, from noon to dewy eve”—

but from the fixed stars to the region of the planets ; from the sphere of the planets to that of the earth ; and thence to the regions of Proserpine and Pluto. Some even believed that all mankind came from the stars, and that each soul would return to that from which it descended.

Addison makes Nature to grow old, to sink in years, and to dissolve : in answer to which, let me refer you to Milton's poem, “ *Naturam non pati senium.*” Geology teaches that, in the history of our planet, many changes have taken place ; and it is reasonable to suppose that all those changes were improvements, and for the better.

The Greeks and all the Eastern poets animated every department of Nature, and the stars were, in consequence, far from being neglected.* Virgil

* The myriads of petrified remains disclosed by the research-

goes even so far as to hint that, as bees and other animals came from them, each animal after death would return to its own peculiar star.

Anaxagoras also believed the stars to be inhabited. "Have you no concern for your country?" inquired a citizen of Athens. "Oh yes!" answered the philosopher, stretching his hands towards the heavens, "I have a very great concern for my country." Origen entertained the same belief. The Spirit of God, in fact, moves on the face and throughout the depths of the universe, and leaves no part of creation destitute of life.

Conjectures relative to the size, nature, qualities, and capacities of the stellar inhabitants are idle to the last degree. We know nothing in regard to them. Whether larger or smaller; possessing fewer or more senses; with less or more extended endowments, where is the use of indulging even the shadow of a supposition? Their senses may be different; their whole natures, in fact, may be so different as not to present the slightest analogy to anything we ever heard of, saw, dreamed of, imagined, or have the power to imagine; for the skies

"Inform us of superiors numberless,
As much in *excellence* above mankind,
As above earth in magnitude the spheres."

The day is the period of action, night the season of meditation. Though we may acquire greater knowledge of man during the day, we acquire a wider knowledge of Nature during the night. Scenes by day rivet us, scenes by night clothe us with wings. The pall, the coffin, and the spade tell us we

es of geology all tend to prove that our planet has been occupied, in times preceding the creation of the human race, by extinct species of animals and vegetables, made up, like living organic bodies, of "clusters of contrivances," which demonstrate the exercise of stupendous intelligence and power.—BUCKLAND: *Bridgewater Treatise*, pref., p. viii.

shall perish ; the planet, the satellite, the comet, and the star whisper to our imagination—*There is room for myriads of myriads of myriads !*

As the state of man, there can be no doubt, is progressive, that of planets and suns we may suppose progressive also. They may not (any of them) have come to their full maturity of excellence. Nature may not have yet put her finishing hand to any one of them. Thus also with our earth : common experience teaches us that it is improving every day. Savage animals are decreasing ; fens are drained ; forests no longer cover one third of the globe ; rivers are kept better in their channels ; and the climates of almost all regions appear, in consequence, in a state of progression.

The stars, no doubt, are peopled with beings in harmony with their place of abode, and of which we have no more conception than an insect in the lowest depths of the ocean has of lions and eagles, apes, monkeys, or men.

SPACE—MOTION.

ALL the globes that the utmost power of the telescope can display are but as globules of mist in the range of the universe.

Space, being unlimited, can have no centre ; but where bodies exist and are limited in number, there may be a centre ; yet even then, unless there be a true circumference, there can be no absolute centre, since true centres can only exist where outlines are equal in all their parts.

Space being unlimited, a gravitating power in search of a centre might pierce the recesses of the universe fifty millions of years (and with the rapidi-

ty of gravitation), and yet be no nearer then than at the moment in which its flight began.*

Secondary motions may be understood, because they are communicated. Primary motion cannot be defined, because it cannot be imagined. Operating invisibly to human scrutiny, and the mind being itself a mechanism, it cannot, by any principle of possibility, contemplate that which is probably not only not a mechanism, but the instrument employed to produce all mechanism.

Primary motion, in fact, involves all the mysteries of the creation. Changes and modifications we witness every day, in all that move, in all that are in rest. We can, therefore, imagine ten millions of secondary motions, but we cannot imagine ONE ORIGINAL.

There is, doubtless, some central point in the uni-

* STEPS INTO SPACE.

SOLAR SYSTEM.

- | | |
|--------------------------------|-----------------------------------|
| 1st step into space, the moon. | 7. Ceres. |
| 2. Venus. | 8. Pallas. |
| 3. Mercury. | 9. Juno. |
| 4. Mars. | 10. Jupiter and his 4 satellites. |
| 5. Sun. | 11. Saturn and his 7 satellites. |
| 6. Vesta. | 12. Uranus and his 6 satellites. |

SIDEREAL SYSTEM.

13. Sirius and other stars of the first magnitude.
14. α , Cygni; β , Tauri, &c.
15. γ , Cygni; ϵ , Bootis, &c.
16. Stars of the 4th magnitude.
17. ————— 5th do.
18. ————— 6th do.
19. ————— 7th do.
20. The white cluster in the sword-handle of Perseus.
21. The small nebula north, following H Geminorum.
22. Nebula between η and ζ Herculis.
23. Nebula in the girdle of Andromeda.
24. Stars of the 1.342d magnitude.
25. The clusters of stars, only seen through a reflector of 40 feet. These are calculated to be above $11\frac{1}{2}$ millions of millions of millions of miles from us; viz., a distance exceeding that of the nearest fixed star at least 300,000 times.

verse round which all bodies roll, as there is also a thin, subtle, elastic fluid, invisible to us, filling all parts of space, which serves as a medium of communication from one to all. Whether this fluid has a retarding influence at one time, and an accelerating one at another, we are yet ignorant ; and whether successions of particles are emitted from each body, or motions communicated by them to particles in their vicinity, and transmitted by successive impulses to other particles, are equally unknown to us.

The orbits of planets may be changed in the succession of ages ; nay, the whole solar system, as it exists at present, utterly annihilated : but this involves no destruction of matter ; and whether they exist separately or form one vast union, what does it import ? The system may be changed ; Uranus might fall into Saturn ; both into Jupiter ; and these, successively, might carry the Asteroids, Mars, the Earth, Venus, and Mercury, into the Sun ; and what would it avail ? nothing is annihilated.

As to changes, they are seen every moment. The destructive and the preservative principles are ever working : destructive as to form, preservative as to essence. In the wildernesses of space the mind finds no resting-place ; for creation on creation still multiplies, attesting at every step not only unity of design, but identity of operation ; not only life for to-day, but life for the morrow.

VIEWS FROM THE PLANETS.

ONE thing is exceedingly agreeable to my imagination : we all see the same stars that were beheld by Moses, Pythagoras, Aristotle, and Hipparchus ; Kepler, Copernicus, and Newton. Some astronomers have had a still more exalted privilege. Thus Galileo was the first to see the satellites of Jupiter ;

Horrocks and Crabtree to behold a transit of Venus ; Herschel to see the satellites of Uranus,* as well as those of Saturn ; and Piazza, Olbers, and Harding, to discover Ceres, Pallas, Juno, and Vesta. Herschel was the first also to gaze on myriads of suns !

“ Range where we will, in water, earth, and air,
God is in everything, and everywhere.”

I pity the man who, from whatever cause, thinks otherwise.

We gazed last night on several splendid objects. Arcturus, for instance, and another star in the constellation of Boötes, eminently attractive to the imagination, since, though it seems to be one, it is actually two, of different colours ; one sun rolling about another sun, as if the smaller were a planet.

Then we gazed on No. 24, in Berenice's hair (double), the larger one of a ruddy complexion, the smaller green. The former sometimes appears white, the latter blue.

Then we turned our telescope on ξ Hercules, another double star ; one ash-coloured, the larger of a bluish white. One of these stars sometimes eclipses the other.

Turn now to No. 48 in Cancer, and we find that also to be a double star ; the larger one of a fine yellow, the smaller of an indigo blue. Sometimes the latter is of a deep garnet, and sometimes bluish or blue. With these alternations, the question arises whether they are to be attributed to the stars themselves being liable to change in colour and intensity of light, or to variations in our own atmosphere. If the first, there is sometimes a yellow day, sometimes a blue one and sometimes a day of deep garnet.

In the Crown there is a star forming an equilateral triangle, placed precisely in the centre of a small nebula, which extends a little beyond the stars, sur-

* Uranus had been noticed before, though not recognised as a planet.

rounding them on all sides like an atmosphere. How beautiful!

"Thou great FIRST CAUSE, least understood,
Who all my sense confined
To know but this—that thou art good,
And that myself am blind."

Engaged thus, we at length withdrew our attention from the more distant regions of space to the more limited circle of our own system, imagining to ourselves the various appearances presented in the firmament above to the inhabitants of the various planets beneath. For ourselves, we behold a thousand worlds, and are yet indifferent to most of them. We are on the wrong side of the mirror in many respects; and, being incapable of estimating the harmony of arrangement which governs the sphere above us, this, of itself, is sufficient to convince *me* (whatever may be its effect upon others) that we are on the road to another and an improved state, where we shall behold objects with a clearer vision and a more perfect understanding.

Were we in the planet MERCURY, the solar spots would appear seven times larger to us than they do here; the sun would be seen to rise and set with unimaginable splendour; while by night, Venus, the Earth, and its "fair attendant" satellite, would exhibit themselves, each many times larger than Mercury appears to us. The moon, too, would be often seen to transit the earth, and every now and then to glide into and emerge from its shadow.

Were we transplanted to Venus, Mercury would present to our eyes phenomena similar to those which Venus presents here: sometimes full, sometimes gibbous; at other times a crescent; now a morning star, and now an evening one; while the earth and moon would shed a light more brilliant than that communicated or received by night by any other planet of the solar system.

Towards the extreme south of our horizon, some stars are visible only for a short period of the night, others for a longer period, till the eye rests on those which rise exactly east. Then directing our contemplation to the polar circle, our vision rests on stars which never set: presenting, therefore, no aspect of change but that arising from an apparent alteration of position.

The Moon.—When the sky is clear in the south and west, and she rises in “clouded majesty” in the east, exhibiting her “freckled face” at a distance of not more than 240,000 miles, what a magnificent body does she appear! What a splendid spectacle, too, does the earth present to her! It seems the largest body of the universe, with a surface thirteen times larger than the moon appears to us, immovably settled in the sky, while the fixed stars are seen to pass slowly both beside and behind it.

We have four seasons; but the moon’s axis being nearly perpendicular to the plane of the ecliptic, she experiences scarcely any change: has perhaps no clouds, no snow, no rain, no air—having no atmosphere. Those who live on her surface, therefore, can neither have the face, figure, nor faculties of man.

There are no phenomena more calculated to excite wonder in respect to order and precision than eclipses and the returns of comets; nothing more indicative of design; and nothing more expressive of a universal predominating intelligence. We gaze upon the zodiac, the starry firmament on either side, and the galaxy, forming “a broad and ample road,” as it were, “*ad Regalem domum*,” and reflect on the “*Densa stellarum corona*” which they present, till we feel as much lost

“As the poor Indian, whose untutor’d mind
Sees God in clouds, and hears him in the wind.”

When we look at the moon in her second quarter through a good reflector, the shadows of her mountains are not only to be seen, but they are observed

to move, and specks of light are visible on some of her mountain-tops. They cannot be mistaken. The surface of her orb resembles burnished gold: but I think she cannot be of the same substance as the earth. So beautiful, so calm—who would not desire to be transported to her surface?

As the moon is next in lustre and utility to the sun, there can be little doubt that she obtained a very early share of veneration. Indeed, we know that in most countries she has been worshipped as a deity under various names. Some lines of Orpheus represent the moon as resembling our earth, having cities on its surface. Xenophanes held the same opinion; and so also did Macrobius, and Achilles Tatius. Pythagoras went farther, and believed it to have not only mountains, valleys, woods, rivers, and seas, but animals fifteen times larger than ours; plants of rarer beauty; and men superior, not only in size, but in energy and virtue.

Some philosophers, or, rather, poets, have believed the moon to be the abode of dreams; and some, that thither the souls of men are carried after death. Some of the ancients supposed the upper lunarian regions to be the Elysian fields, inhabited by genii, who descend to earth to the assistance of just men and the punishment of wicked ones. Even Christians, among whom we may instance Vitalis, have regarded its surface as the paradise wherein our first parents were created, and whence they were thrust for their transgression.

To the inhabitants of MARS, Venus and the earth appear, in most respects, as Mercury and Venus appear to us; exhibiting similar phases, with the exception that they never present themselves at a full. Sometimes our moon is seen by them on one side of the earth, sometimes on the other. Sometimes they are observed to pass over the disk of the sun in the shape of two unequal black spots, at no greater distance from each other than one third of a degree.

The fixed stars are beheld much as we behold them ; while the Asteroids, with Jupiter, Saturn, and Uranus, present surfaces somewhat larger than they do to us.

The ASTEROIDS are supposed by some to have been originally formed out of one large planet. I cannot accord with this hypothesis. They have doubtless existed from the creation and first adjustment of the system, as well as Jupiter and the other planets. All these planets enjoy a view of each other, as also of the earth (but not of the moon), and Mars, Jupiter, Saturn, and Uranus ; of all their satellites, and of the stupendous rings of Saturn. This is not all. Their diameters are so small that every star of their firmament, from pole to pole, may be seen by the mere travel of a few hours. Their diameters have been thus estimated : Juno, 1425 miles ; Vesta, 238 ; Ceres, 163 ; Pallas, 80 !* The diameters of their

* In a note to my *Life of Akenside* are the following remarks : Dr. Olbers and several other astronomers have given into the idea that a large planet once existed between the orbit of Mars and Jupiter, and that it separated into four parts, forming what are now called the Asteroids. Much learning has been called into action on this subject. It is argued that Bode's law and the law of Nature are one, and that both require the existence of such a planet. If so, why does not this large body still exist ? If it were wanted in times past, it is wanted at present ; for all the apprehensions of Newton in regard to the solar system being susceptible of decay, have long since been dissipated by LA GRANGE's discovery—the most splendid in modern times—that all the irregularities and inequalities which flow from planetary action are, in reality, so harmoniously adjusted to the various parts of the vast machine as to be in all cases constant in periodical return ; and the labours of La Place having established the knowledge that the time of a planet's revolution, as well as its mean distance from the sun, are constant properties, it follows, as a natural result, that all planetary existences are beyond the reach of accident, and therefore unassailable by time.

If four planets will answer the purpose of the one supposed to have been disrupted, as it appears they very effectively do, *what difficulty can there be in supposing that they have existed from the creation and first adjustment of the system, as well as Jupiter and Mars, and all the other primary and secondary planets ? Why,*

three external neighbours, however, are: Uranus 35,112 miles; Saturn, 79,042; and Jupiter, 89,170. What stupendous disproportions!

Now let us suppose ourselves on the surface of JUPITER. The stars rise to our vision, and in the course of three or four hours set. They move, as it were, not in a gradual course, as with us, but with a precipitation that would dazzle our eyes and bewilder our senses; for the entire heavens must appear to the inhabitants there in a state of almost mercurial activity. The day, however, is not so splendid as ours, being so much farther from the sun. The eclipses on Jupiter are of three kinds, solar, lunar, and satellital; and the tints of the satellites have an extremely beautiful effect, for two are white, a third blue, and the fourth orange; and when all of them are above the horizon, the shadows of objects are cast in four different directions.

Transport ourselves now to the FIRST SATELLITE of Jupiter. What a scene presents itself! Three moons rise instead of one, as with us, with all their diversified phases: one a crescent, one gibbous, one at the full! and the nearest with twice the di-

in fact, should we suppose Nature to have done what is not only unnecessary, but in decided opposition to all the laws by which she can be recognised?

Since the phenomena of gravitation cannot in any way be accounted for either by matter or motion; if philosophers guard themselves against being shackled by the bonds of system, and from being paralyzed by the authority even of illustrious names; if they keep themselves free to observe, with unclouded eyes and unbiassed judgment, the varied phenomena presented to their view, and feelingly awake to every light that hereafter may emanate from the experience of the ever-teeming laboratory of the human mind, it is not impossible but that the masterly discovery of LA GRANGE may be found to lead to the propriety of reconsidering the views that have hitherto been entertained of gravitation. And it is not impossible that such reconsideration may open the door to the knowledge of *an agent hitherto unknown and unthought of, acting with it, though of a nature altogether different from it, and of a subtlety and minute power of application immeasurably its superior.*

ameter of our moon to us ; while Jupiter himself hangs like a huge ball, turning rapidly on his axis, now rising, now waxing, now waning, now a crescent, and now a full and ample shield, as it were, covering a vast space of the firmament ; and all this in the short space of forty-two hours and a half. Having, it is presumed, no atmosphere, the heavens present a field as black as ebony, and each star shines with a brilliancy more intense than that arising from the concentration of ten thousand diamonds. In 1770 a comet swept among these satellites without in the smallest degree deranging their motions. The Biela and Encke comets, too, ranging through the solar system between Jupiter and the earth, their aphelion and perihelion are equally harmless.

SATURN, when beheld from our globe with his attendants through a telescope, appears to occupy a space of the heavens not larger than a Spanish dollar. Instead of one moon, he has seven ; all presenting varied appearances, and casting seven shadows upon his surface. Sometimes they are beheld eclipsing each other, or appearing, disappearing, and reappearing from between and behind two stupendous rings that surround his orb, and which frequently eclipse a great part of it ; those eclipses varying from a minute to the whole length of a day, and coming on with a suddenness that would appal the mind, did not their frequency take from the wonder. The day of Saturn, too, occupying only a little more than ten of our hours, the whole phenomena of the firmament above him pass with a rapidity more than double that presented in our own hemispheres. The rings, also, sometimes cast shadows upon him, and sometimes shine with even greater splendour than the planet itself. Above, below, and between these vast arches, if we may so call them, the stars are seen, and, possibly, many planets of which we have no knowledge. 'These

rings are not perceptible at the poles of Saturn, nor within several degrees of them; but where they are visible, nothing that we know in Nature presents so noble, so wonderful and astonishing an appearance, illuminating the nights with a splendour more than equal to that of several thousand moons like ours: indeed, Saturn knows no darkness except when these rings eclipse the sun.

Pass now into the regions of URANUS. The sun here appears of a size not larger than Venus. Six satellites, however, rise in his horizon, and, what is still more wonderful, they are observed to move in orbits perpendicular to the plane of the ecliptic, and in a direction contrary to that of all other secondaries as well as primaries; indicating, perhaps, an approach to, if not an actual beginning of, another province of the solar empire. Uranus, however, sees only one of the planets that we behold—Saturn. But, to make up for this, his inhabitants doubtless gaze on many other worlds beyond their own orbit, which, from distance, are invisible to us.

Now let us suppose ourselves on the surface of a comet. But first a few words in regard to the comets of 1811 and 1835.

The comet of 1811 emerged suddenly, as may be remembered, from the sphere of the sun's rays, and became visible in one day. It remained several months, and at length disappeared in the Great Bear. We watched it night after night, and hailed it as a herald sent from the depths of space to confirm the truth that a Sublime Power exists beyond the reach and thought of man.

This was the most splendid comet that has appeared within the memory of any living person. Its tail (when at its greatest apparent height) reached more than 120 millions of miles. Its envelope was supposed to have been 30,000 miles in thickness, and the centre of its head was separated from its interior surface by a space of 36,000 miles. Its

size was calculated to be 527.3 times smaller than that of the sun, but 17 times larger than that of Jupiter, 25,104 times larger than that of the earth, 1,255,000 times larger than that of the moon, and with an orbit exceeding those of all the planets of our system added together, while its period of revolution is supposed to be not less than 3380 years! At the end of that period, therefore, it may be expected to return, and become again visible; for Nature is

“ A solemn institute
Of laws eternal, whose unaltered page
No time can change.”

Oct. 10, 1835, our little boy came running from the garden opposite, between six and seven, almost breathless, crying out “ God has made a new star all at once.” On looking out, we found it to be the comet which had been anxiously expected, but which we had not been able to get a sight of, owing to the continual mist. This comet was Halley’s.*

* Astronomers represent Halley as having been the first to foretell the precise return of a comet, and have the prediction verified. Whiston, however, claims it for Newton, in regard to the comet of 1736. The data on which he predicted this return does not appear; but Whiston says, “ As far as we yet know, Sir Isaac is the first man, and this the very first instance, where the coming of a comet has been predicted beforehand, and has actually come, according to that prediction, from the beginning of the creation to this day.”

Nor is Whiston the only writer who mentions this prediction and fulfilment, for Thomson alludes to both :

“ He, first of men, with awful wing pursued
The comet, through the long elliptic curve,
As round innumerable worlds he wound his way,
Till, to the forehead of an evening sky
Return’d, the blazing wonder glares anew,
And o’er the trembling nations strikes dismay.”

It is very curious that neither Bradley, nor Arago, nor, indeed, any other astronomer except Whiston, has said one word as to the circumstance of this comet’s return having been predicted by Newton.

When this comet is nearest to the sun's centre (forty-seven millions of miles), that luminary appears to its inhabitants about four times larger than it does to us; and when at the greatest distance (3,372,000,000 miles), the sun cannot appear larger than a star of the first magnitude.

But let us suppose ourselves, as I said before, upon the surface of a comet. If comets are self-luminous,* as in numerous instances I am disposed to think they are, we shall see nothing beyond our own globe, our eyes being partly blinded with excess of light. If, however, they are dark spheres, illuminated by other bodies, we shall behold nebulæ, systems of stars, suns, and comets, unseen by mortal eyes. We enter at length the solar regions. We behold Uranus and his satellites moving in a course contrary to all other analogies; we pass the empire of Saturn, encircled by his seven moons and double ring; we come within the orbit of Jupiter and his

Soon after the return of this comet in 1230, there was a great pestilence; and similar visitations attended its return in 1305 and 1380. As it passes from the region of the Bear through the middle of Boötes, and thence through the Serpent and Ophiuchus, it is not impossible that this is the very comet that was in Milton's mental eye when he wrote the following passage:

"On the other side,
Incensed with indignation, Satan stood,
Unterrified; and like a comet burn'd,
That fires the length of Ophiuchus huge,
In th' arctic sky; and from his horrid hair
Shakes pestilence and war."

* I published some remarks on this subject three or four years ago, in the LITERARY GAZETTE, wherein I stated my belief that comets carried their own light. This idea seems to be confirmed by what a learned writer in the Quarterly Review states of M. Struvé's observations on the Halley comet: "It has an elliptical nucleus, the greater diameter of which was from 1".5 to 3" of a degree, and the lesser diameter 0".4. It resembled a burning coal; from thence issued, in a direction nearly opposite to that of a tail, a divergent flame, varying in intensity, in form, in direction, sometimes even double; one might fancy that luminous gas was issuing from the nucleus."—*Quarterly*, cix., 221.

four companions; we pass the Asteroids, and gaze with delight on their diminutive masses, as we had before with amazement on the immensity of others; we invade the orbit of the earth; we dart through it to those of Venus and Mercury; and then, traversing the more immediate regions of the sun, we pass on to the other side, and commence our return to our secret aphelium in the bosom of space.*

THE INVISIBLE UNIVERSE

TILL the invention of the microscope and micrometer, the invisible universe contained, with its other secrets, more than half the wonders of entomology.

The belief in INVISIBLE BEINGS is many thousand years old. Hesiod and Plato frequently allude to their existence; and Epicurus admitted beings into his philosophy of a purer nature and more ample faculties than those enjoyed by man.† The late illustrious chymical philosopher (Davy), too, distinctly allowed that there may be beings, "thinking beings," nearly surrounding us, which we can neither see nor

* I cannot imagine any comet to move in a hyperbola or a parabola, because those courses appear to be entirely inconsistent with attraction; viz., that comets so moving enter our system for the first time, then depart and never return. This is beyond the boundaries of our present geometry to prove, whatever we may think. The probability rather is, that if once seen here, the one seen has been seen before, and will be seen again.

† Hesiod makes them wander over the earth, keeping account of human actions, both just and unjust. Maximus Tyrius entertained the same belief. St. Chrysostom also believed that every Christian has a guardian angel. Cardan insists that he was attended by one, as Socrates, and Iamblichus, and many others supposed themselves to have been. Hermes, a contemporary with St. Paul (Rom., xv., 14), in his work entitled PASTOR, often quoted by the fathers, assigned to every one not only an angel-guardian, but a devil, who is his tempter.—Vid. Butler's Lives of the Fathers, v., 148.

imagine. Milton also has several passages implying the same.

"Millions of spiritual creatures walk this earth
Unseen, both when we wake and when we sleep."

In another place he speaks of creatures playing in the colours of the rainbow; and in a third, thus:

"Time may come, when men
With angels may participate, and find
No inconvenient diet nor too light fare;
And from these corporeal nutrimenta, perhaps,
Your bodies may at last turn all to spirit."

Poetry sometimes is philosophy: and who can dream of what may be imbodyed or enveloped in those astonishing agents, HEAT, LIGHT, ELECTRICITY, and ATTRACTION? In all Nature there is no vacuity. To insist that nothing exists but what the human eye can see, is more worthy the intellect of a Cloten or a Caliban, than of that of a Milton, a Newton, a La Place, or a Davy.

DURATION.

THE duration of life appears far more arbitrary than the duration of unconscious bodies. Some plants rise from seed in the spring, flower in the summer, shed their seeds, and die in autumn or in winter. Some last two years, and others three; but the principal part are perennial, as grass, all manner of shrubs, and every description of trees. Some blossom only for one day, and others for only one night. The *chrysanthemum putrescens* bears flowers for the greatest portion of the year; the *thuyas* of China keeps in full leaf in winter and in summer; while the amaranth and rose of Jericho may be preserved for several years. Most plants live independent of the partial loss of either leaves or flowers, but the death of a blade of the papyrus involves that of the

bud and root attached to it. Some flowers, kept in cold water till they droop, may be restored to life and freshness by being placed in hot water. Then, if the coddled stems be cut off and put into cold water again, they may be preserved even to a third stage of existence.*

The Italian cypress lives two hundred years; there is a tree at Basle two hundred and fifty years old: the oak is one hundred years in arriving at perfection, and lives to the age of three hundred. Date-trees in Spain attain a similar age. Many plantains in India are one thousand years old; and the cedars on Mount Lebanon have an age of not less than two thousand years.

In respect to insects, some have their duration in proportion to the duration of a leaf, some to that of a flower, and others to that of a plant. Earth worms live three years, crickets ten years, bees seven, scorpions from seven to twelve, and toads have been known to arrive even to thirty. Wasps and spiders, on the other hand, live but one year; an ephemeron, in a flying state, only one day. But naturalists

* The Indian fig is subject to a curious kind of paralyzation. Sir James Smith alludes to this circumstance in his Introduction to Physiological and Systematical Botany, p. 260.

"This plant is affected by gangrene, and a still more serious disease, called by Thierry '*la dissolution*.' This seems to be a sudden decay of the vital principle, like that produced in animals by lightning or strong electricity. In an hour's time, from some unknown cause, a joint, a whole branch, or sometimes an entire plant of this species (*Cactus coccinellifer*) changes from apparent health to a state of putrefaction or dissolution. One minute its surface is verdant and shining; the next it turns yellow, and all its brilliancy is gone. On cutting into its substance, the inside is found to have lost all cohesion, being quite rotten. The only remedy in this case is speedy amputation below the diseased part. Sometimes the force of the vital principle makes a stand, as it were, against the encroaching disease, and throws off the infected joint or branch. Such is the account given by Thierry, which evinces a power in vegetables precisely adequate to that of the animal constitution, by which an injured part is, by an effort of nature, thrown off to preserve the rest."

speak incorrectly when, on the authority of Cicero and Aristotle, they say that those which die at nine in the morning expire in their youth, those at noon in their manhood, and those at sunset in their age. For, previous to their winged state, they had existed for two, if not for three years. The flying state is merely a transition, which Nature has decreed to them for the greater facility of ensuring a succession.

In respect to fishes, crayfish live twenty years ; pikes have frequently attained ninety, the carp one hundred and fifty, and the amphibious tortoise three hundred.

Hens live ten years, nightingales sixteen, linnets forty, geese fifty, parrots sixty, ravens ninety, cockatoos one hundred and two years, falcons two hundred, and swans two hundred and ninety.

Squirrels live seven years, hares eight, cows fourteen, cats eighteen, fallow deer twenty, stags forty, the ass from thirty to fifty, the lion to seventy, the one-horned rhinoceros to eighty, and elephants to two hundred years.

Many plants, insects, fishes, birds, and even quadrupeds, are peculiarly sensible of injury ; others are strikingly vivacious. Some animals will live after the spleen has been taken from them. Dr. Hook hung a dog, then cut away its ribs, its diaphragm, its pericardium, and also the top of its windpipe, and yet restored it to life for a while by infusing air into its lungs. The sloth will even live for some time after the extraction of its heart and bowels.*

* "In general," says Mr. Brodie, "we see life combined with action ; and living beings present an endless multitude of phenomena in perpetual and rapid succession. Life, however, may exist independent of any action which is evident to the senses. A leech, which was immersed in a cold mixture, was instantly frozen into a hard solid substance : at the end of a few minutes the animal was gradually thawed ; the leech revived, and continued to live for thirty-six hours after the experiment."

Tortoises, serpents, moles, and bats, are able to live for some time without continuing to breathe. This faculty they derive from the circumstance of the lungs having been left out in the circulation of the blood. The opossum of Brazil is so difficult to kill, that when it has been crushed it will creep away; and when the breast of a frog is opened, and its heart and intestine parts taken out, it will yet leap as if it had sustained no injury; while land-tortoises, and the whole tribe of lizards, will continue to live, not only when deprived of their brains, but of their heads. Some animals will exist even in vacuo. This may be proved by leaving some *tenebrions* in an airpump for several days. Sir John Pringle says that he cut off the heads of several large moths with a pair of scissors, and that some lived from three to sixty, and even seventy days. Blumenbach records several curious facts. The wheel-worm, kept in a dry state for a year, may be revived by placing it in contact with a drop of water, and this for several times. The *cerambyx* will live a month after being transfixes with a pin; and the legs of the opilio spider have a vital motion after they have been a day torn from the body.

The cause of this may be attributed to the circumstance of Nature having given little or no concentration of life to certain animals. In man, quadrupeds, and birds, the brain is the centre of the nervous system; but in reptiles, and in some, if not all insects, the nervous irritability seems to be diffused over the whole system. Caterpillars will live for several days in an exhausted receiver; and though they will appear dead, exhibiting no motion, yet upon being exposed again to the air they will revive, and recover their wonted activity.

But Nature affords phenomena still more wonderful even than these. Living shellfish are sometimes found in solid stones in the harbour of Toulon, where they are called *Dactyli*, and are of exquisite

flavour; and shellfish called *Solanes* are found in stones near Ancona, in Italy. Fulgosus relates that a live worm was once found in a flint; and Alexander Tassoni says that some workmen of Tivoli, having cleft a mass of stone, found a crayfish in the middle of it, which they boiled and ate. M. Seigne saw one in the body of an oak near Nantes. Bacon and Plott mention similar instances. Mons. Hubert found one in the trunk of an elm near Caen; and a live beetle was, not long since, found in the heart of a tree near Carlisle. The eggs of these animals must have accidentally been insinuated into the trees when young; where, as Hubert conjectures, they must have grown with the tree, and fed upon its substance, deriving air from the moisture of the tree. A woodman, lately splitting a large cherry-tree at Haming, in the county of Selkirk, found a living bat of a bright scarlet colour. The cavity in which it was enclosed was surrounded by wood perfectly sound and solid. Not long since, a living toad was found in the heart of a cedar at Westchester, in America, about half grown. The cavity was just large enough for it. The tree was solid, of thirty years' growth, and there was no communication for the circulation of air. In 1773 a toad was found even in a large block of coal, in the substance of which no fissure could be perceived.* They have also been found in flints.

* Two toads were locked up in a box, by way of experiment, at a village near Wakefield, in 1806; taken out in 1807, when they were found alive and healthy, after living all this time without air or food.

"The *verticella rotatoria*," says St. Pierre, "is found in a state of such thorough dryness as to fall into powder on being touched with the point of a needle. It may be preserved for a number of years in an apparent state of DEATH, continuing to retain life without seeming to take any nourishment. A little drop of water let fall upon it is sufficient to break it, so delicate are its organs; but if this water reach it through particles of dust, the insect opens its members by degrees, and swims in this single drop as in an ocean."

An insect resembling a worm was also found in a cell, the size of a sparrow's egg, in a fragment of coal (1820), dug out of Woodey-field pit at the depth of twelve fathoms. When touched, it moved its conical part to any side, thus showing it had a rotary motion. It had five or six circular horny rings, connected by moveable membranes. The tree which contained the toad seen by M. Seigne was about a hundred years old; but in respect to the age of the worm found in the coal, it would be impossible to form even the slightest probable conjecture.*

Nature has the curious custom of suspending the animation of certain animals and vegetables. Some quadrupeds, birds, reptiles, and insects, at the autumnal equinox, earlier or more late, according to the relative character of the season, enter into a dormant state, and remain so till the following spring. This remarkable suspension arises, perhaps, from the influence of galvanic power.

Frogs have recovered their animation after having been buried two years in snow, and snails have revived even after a suspension of vital activity for fifteen years. Similar effects have been observed in the seeds of plants. A seed of a royal Scotch thistle was planted after having been laid up more than sixteen years. It sprung, vegetated, and produced a plant, the foliage of which was resplendently beautiful. Sensitive plants are said to retain the virtue of germination from thirty to forty years, and oats even to a thousand! The olive resuscitates

* "For aught we know," says Sir John Herschel, "the same identical atom may be concealed for thousands of centuries in a limestone rock; may at length be quarried, set free from the limestone, and mix with the air; be absorbed from it by plants, and in succession become part of the frames of myriads of living beings, till some concurrence of events consign it once more to a long repose, which, however, in no way unfits it from again returning to its former activity."

from the smallest fibre of the root. The mustard and wild radish will remain for many ages without germinating, after which, if turned up, they will grow. But a still more wonderful circumstance was stated a short time since (July, 1830) by Mr. Houlton, in his introductory lecture as Professor of Botany to the Medico-Botanical Society: "A bulbous root which was found in the hand of a mummy, in which situation it had been for 2000 years, germinated on exposure to the atmosphere, though, when discovered, it was in appearance perfectly dry. The root was subsequently put in the ground, when it grew readily and with vigour."

The principle of life, the connexion between function and structure, the constitution of the intellectual faculties, the principles of mind, and, perhaps, also of sensation, are all unknown. But that the human frame is subject to a suspension of animation is evident from many instances recorded, on testimony at once authentic and decisive. Dr. Crichton* gives an account of a young lady who was in a state of suspended animation so complete as to be to all appearance dead. She was put in her coffin, when the horror of being buried alive gave such an activity to sensation, that it exhibited itself by a slight convulsive movement of the hands. While in this state, as she related afterward, she distinctly heard her friends lamenting her death.

* "We have witnessed," says a Bavarian letter, "the superb funeral of the Baron Hornstein; but a shocking result is what induces me to mention it in my letter. Two days after the funeral the workmen entered the mausoleum, when they witnessed an object which petrified them! At the door of the sepulchre lay a body covered with blood. It was the mortal remains of the favourite of princes. The baron was buried alive! On recovering from his trance he had forced the lid of the coffin, and endeavoured to escape from the charnel-house. Finding it impossible, it is supposed that he dashed his brains out against the wall. The royal family, and, indeed, the whole city, are plunged in grief at this most horrid catastrophe."—*Whiter's Dissertation on the Disorder of Death*, p. 276.

The human frame, up to the period of five years, grows so rapidly that it has attainedn early as great a height as it does in sixteen years afterward. With man, as with all other objects, time never assumes the attitude of repose. His life resembles a ship that never anchors. For whether he eats, drinks, walks, speaks, slumbers, or meditates, time with him is ever on the wing. And as those objects are the most sublime which are only partially visible to the eye, time is one of the most mysterious subjects on which the mind can meditate ; since, constituting what has been called "a movable image of immovable eternity," the solitude of interminable space seems the only mansion for its residence. Still time is only an imaginary quality ; to two persons differently situated, it has the wings of an eagle or the feet of a snail. To a man in expectancy, a day appears a week, a month a year. To one in possession, the sun seems no sooner risen than it goes down, and summer has scarcely arrived before autumn seems ready to appear. Infants count by minutes, children by days, men by years, comets by revolutions of ages, Nature by revolutions of systems. The Eternal exists in a perpetual present.

Who shall presume to calculate the respective ages of the fixed stars ? No one ! Yet when it may be proved by the velocity of light, that when we look at Sirius, the rays which enter the eye cannot have been less than six years and four months and a half coming from that star to the observer, it follows that when we see an object of the calculated distance at which some of the nebulæ may be perceived, the rays of light which convey their images to the eye must have been nearly two millions of years on their way. So old, therefore, at the least, must be the stars composing those nebulæ, viz., two millions of years ! How much older need not be conjectured. The records of our own globe do not exceed six thousand.

Though Nature appears to suffer some of her works to decay, yet, delighting in variety, and in resolving matter into new creations, she is only varying her attitudes, nothing being permitted actually to be lost. Ever attentive to her interests, she replaces in one spot what she has displaced in another. Ever attentive to beauty, and desirous of resolving all things into their original dependance on herself, she permits moss to creep over the prostrate column, and ivy to wave from the time-worn battlement. Time, with its gradual but incessant touch, withers the ivy and pulverizes the battlement. But Nature, ever magnificent in her designs, conceiving and executing in one and the same moment; whose veil no one has been able to uplift; whose progress is more swift than time, and more subtle than motion, and whose theatre is an orbit of incalculable diameter; jealous of her prerogatives and studious of creation, expands, as it were, with one hand what she compresses with the other. Always diligent, she loses nothing; for, were any particle of matter absolutely to become lost, bodies would lose their connexion with each other, and a link in the grand chain be dropped. From the beginning of time not an atom has been annihilated; not the minutest particle of what we denominate element; nor one deed, word, or thought of any of his creations has ever escaped the knowledge, or will ever escape the memory, of the Eternal Mind: that Mind which knows no past, and calculates no future!

MAN COMPARATIVELY A RECENTLY CREATED BEING.

IN the surveys hitherto made by geologists, it has been observed that no organic remains have been discovered in the interior substances of which the

stones of the primitive mountains are composed, they being found only in those mountains called secondary, which rest on the sides, and sometimes even cover the summits of primitive ones. It has also been observed, that all fossil remains of viviparous land animals have been found in alluvial soil, or near the surface of the earth; and as no remains of the human species have yet been discovered in ancient alluvial ground, it has been inferred that the geological changes already alluded to took place before the present race of man was formed. Skeletons have been dug up in various places, but from no situation invalidating this supposition, they having been evidently imbedded and agglutinated at no very distant period. In the Villa Ludovici, near Rome, is a skeleton incrustated with stone; and in the British Museum is a fossil human skeleton, found in Guadaloupe, imbedded in limestone. At the founding of Quebec, a savage was dug up, petrified, from the lower strata, with his arrows and his quiver. A skeleton was also found in a lead-mine, mixed with stags' horns, in 1744; and in a mine at Falun, in Sweden, two human bodies were at different times found, impregnated with vitriol of iron; at Andrarum, impregnated with sulphur; and in Norway, impregnated with copper, on a bed of loadstone. Others have likewise been found in mines, having a mineralized appearance.

Whether the changes that have taken place on this globe took place prior or subsequent to the formation of man, it is impossible to determine. What is now sea was probably once dry land, and what is now land in great part an ocean. This supposition involves difficulties of the first importance; but it is the only rational one that, in the present state of geological science, can reasonably be entertained. Future discoveries will doubtless afford more correct data; and time, and unwearied application to the general subject, may render that evident which is

now mysterious, this science being still in its infancy.

That vast deluges, and mountains rising from the bed of the sea, have occurred at distant epochs, seems certain. The last great change is supposed to have occurred about six thousand years ago. But what are six thousand years? Mere days! being little more than seventy summers and winters of the planet Uranus. And here a fine passage occurs to my mind from Berkeley's Minute Philosopher: "Though I cannot with eyes of flesh behold the invisible God, yet do I, in the strictest sense, behold and perceive by all my senses such signs and tokens, such effects and operations, as suggest, indicate, and demonstrate an invisible God."

Man would seem to have been comparatively but a recent sojourner on the earth! "Between the first creation of the globe," says an eminent philosopher, "and the day in which it pleased God to place man upon it, who shall dare to define the interval?" Of all the animal species, man is supposed (and the idea is in a great measure confirmed by geology) to have been created *last*.

That man is only of comparatively recent existence may also be deduced from the comparative infancy of his present mind. The swallow travels and the bee builds just as they travelled and built in the days of Job, Moses, and Sanchoniathon. But man—his capabilities and acquisitions are all progressive, not only as an individual, from infancy to age, but as a species, from the beginning of time to the end of it. This, I think, is shown by every discovery he makes, and by every new invention. What treasures of capability lie hid, yet to be developed, in the human mind, who can determine?

The *present disposition of things* has had an existence of only about six thousand years; that is, a fraction only of the time that light takes in passing from Arcturus to our vision; or, as we before said,

only seventy summers and winters of the planet Uranus; and yet we all speak of the antiquity of things!

MEN are in possession of ages, but MAN is only in his infancy of faculty. If NATURE—and when I speak of Nature I (ALWAYS) mean and have meant by that term the general and particular fundamental laws of the DIVINITY, operating throughout the universe—if Nature can produce *one* Newton, she can a thousand; if a thousand, a million; if a million, myriads of millions. The producing a GROTIUS, a MOZART, and a BIDDER, whose early indications of faculty are more wonderful to my mind than even the comprehension of a Galileo at a maturer age, evidently prove what Nature *can* do, and what possibly she may hereafter do. The mind of man, I say, is still in its infancy of power, and may therefore hereafter, when it shall be in its zenith, be, in comparison with its state at present,

“ Like another morn
Risen on mid-noon.”

LOVERS OF NATURE.

THERE are some men whose love of Nature leads them too far into the regions of hypothesis, but whose very errors teach us to think. Others there are whose disregard to everything not immediately connected with their personal interest is so great, that they would esteem any one idly employed who was investigating a plant, were it ever so beautiful or curious. The best way of viewing Nature is to unite poetry with science, and to enlist both in the pursuit of truth, in order that both may affect the heart and purify the mind. “There is nothing so delightful in literature,” says Cicero, “as that branch which enables us to discern the immensity of Na-

ture; and which, teaching us magnanimity, rescues the soul from obscurity." Thus, too, thought Neck-er; for even amid the factions of Paris he could recur to Nature's sublimities, and in age he still retained the imagination and sensibility of youth.

No writer, ancient or modern, has shown a greater relish for natural beauties than HORACE. "With a fountain of clear water," says he, "and a shady wood, I am happier than a prince of Africa. Ah! how delighted am I when wandering among steep rocks and woods, since the shades of forests and the murmuring of waters inspire my fancy, and will render me famous in all future ages. Sing, oh ye virgins! the beauties of Thessalian Tempe, and of the wandering isle of Delos! celebrate, oh ye youths! the charms of that goddess who delights in flowing rivers and the shades of trees; who lives on the mountain of Algidus, among the impenetrable woods of Erymanthus, and on the green and fertile Cragus."

TIBULLUS was equally sincere in his love for the country. Descended from an honourable branch of the Albian family, he fought for the cause of the people by the side of Messala; and though animated with all the fervency of a grateful friendship towards that celebrated statesman, he disdained to follow his example in paying court to the conqueror at Philippi. Weary of a hopeless contest, and disgusted with the corruptions of the times, he retired to Penum, there to indulge in the innocent occupations of a country life; to recruit his finances, and, in the alternate amusements of agriculture and poetry, to sooth the disappointments of his heart; and, above all, to retain unimpaired those high and generous ideas of liberty, which he had imbibed in early youth from the lessons of his preceptors and the splendid examples of former ages.

v "If life were not too short," says Sir William Jones, "for the complete discharge of all our respective duties, public and private, and for the ac-

quisition of necessary knowledge in any degree of perfection, with how much pleasure and improvement might a great part of it be spent in admiring the beauties of this wonderful orb!" This observation is in the true spirit of Plato, and therefore worthy of a man who, in addition to an ardent love of philosophical truth, possessed a genius capable of enlivening jurisprudence, and even of rendering poetical geometry and physics.

CATULLUS, MARTIAL, and STAMUS were ardent admirers of Nature; and equally so were Atticus, Tacitus, and Epictetus. CICERO, who valued himself more upon his taste for the cultivation of philosophy than upon his talents for oratory, seems not to have felt the truth of an adage now so common, that "*the master of many mansions has no home*;" for he had no less than eighteen different residences in various parts of Italy. And though it is probable he had not all of them at the same time, but bought and sold them, as is the custom of the present day, yet it is certain that he had seven at one time. He generally speaks of them in terms of attachment; and they were all erected in such beautiful situations, that he called them "the eyes of Italy." The retreat of Tusculum was, however, his favourite residence. This spot was occupied, previous to the late tumults in Italy, by a Basilian convent of Greek monks called *Grotta Ferrata*; and it was the favourite amusement of the brothers to exhibit to enlightened travellers the remains of Cicero's buildings, and the small aqueducts that watered his garden. This retreat the orator embellished with every specimen of art that his friend Atticus could purchase for him at Athens. It was the most elegant mansion of that elegant age; and the beauty of the landscapes around it, adding lustre to the building, refined the taste of its accomplished possessor. Cicero,

"From whose lips sweet eloquence distill'd,
As honey from the bee,"

draws a delightful picture of the almost infantine amusements of Scipio and Lælius at Caieta and Laurentum; when, fatigued with business, and happy in being allowed the indulgence of a quiet conscience in a retired spot, they grew boys again in their amusements, and derived a sensible pleasure from gathering shells upon the seashore.

The amusements of Cicero himself were equally indicative of an excellent heart. Balanced in his opinions by an accurate knowledge of things, he had most of the distinguishing qualities of genius without any of its eccentricities. Simplicity and dignity were united to the utmost gentleness and good-nature; and, equal to the society of soldiers, statesmen, and philosophers, he danced with youth, and ran, laughed, and gambolled with infancy. He recommends an attention to the natural beauties of the country in which we live. "It is a proper study," says he, "for the serene period of age."

PLINY the Younger, who was accustomed to say, if a man would perpetuate his fame, he must do things worth recording, or write things worth reading, was never happier than when he was indulging himself at his country seats, where he found leisure to write to his friends, and to celebrate the views which his villas afforded. "Tusculum" says he, "is situated in a fine natural amphitheatre, formed by the richest part of the Apennines." "Here," he observes in another letter, "I enjoy the most profound retirement. All is calm and composed; circumstances which contribute no less than its unclouded sky to that health of body and cheerfulness of mind which in this place I so particularly enjoy." "To a man of literary turn," says he in his twenty-fourth epistle, "a small spot is amply sufficient to relieve his mind and delight his eye. Sauntering in his domain, he traverses his little walk with reiterated pleasure, grows familiar with his two or three vines, and beholds his small plantations with satisfaction."

Pliny had several country seats on the Larian Lake, two of which he was particularly partial to. The manner in which he spent his time at those villas he has described *con amore* in a letter to Fuscus. In regard to epistolary writing, I am tempted, with the scholiasts, to give Cicero the preference when the subjects are of public interest ; but when they relate to private sentiments and occurrences, I think Pliny has but few competitors. Indeed, he has none. There is an urbanity and elegance, a devotedness of affection, and an undisguisedness of heart, irresistibly winning and agreeable, which none of the moderns have equalled, and which none of the ancients (if we except Cornelia*) ever surpassed.

DIOCLETIAN, when he selected a spot for his retirement, solicitously observed that his palace should command every beauty which the country would admit. In this retirement he first began to live ; to see the beauty of the sun, and to enjoy true happiness, as Vopiscus relates, in the society of those he had known in his youth. The example of Diocletian was long after remembered by Charles V. of Spain, who, in imitating his Roman prototype, acquired but little fame, and deserved less. It was the extreme beauty of the situation of the Monastery of St. Justus, situated in the Vale of Placentia, and belonging to the order of St. Jerome, which first inspired that restless despot with an idea of quitting a world he had governed so long and so malignantly. As he passed near that monastery, many years before his retirement, he remarked to his attendants that it was a spot "to which Diocletian might have retired with pleasure." The remembrance of this place never deserted him ; and at length, weary of the world, since he was unable to give effect to his projects, he

* This Cornelia was the daughter of Scipio Africanus, and the mother of the Gracchi. Her letters, which were published and in general circulation at Rome, are said to have been perfect models of epistolary writing.

withdrew to the melancholy of a cloister, where in silence and solitude he entombed his ambition, resigned his plans, and, in the hope of conciliating posterity, realized some small consolation for having so long agitated Europe by his projects, devastations, and public murders.

DANTON, the ferocious Danton, the *Moloch of the French Revolution*—even Danton, of all his associates the most energetically depraved, when imprisoned preparatory to his execution, amid all the oaths and ribaldries for which he was so disgustingly remarkable, was often heard to expatiate with all the fervour of a strong mind on the charms of a rural life. This reminds me of COUNT STRUENSEE, who assured Dr. Münter that “the contemplation of the works of Nature had oftentimes afforded him great satisfaction, and that it had been the only means of keeping him from atheism, into which he otherwise certainly should have fallen.”

A curious exemplification of the affection of the human heart for natural beauty is afforded in the instance of Michael Howe, the last and most execrable of all the bush-rangers of Van Diemen's Land. This man, having been transported from England, was assigned to a colonist of that island as a servant. After remaining some time in this situation, he fled, and joined a party of bush-rangers; but, after a multitude of murders, robberies, and escapes, he was at length secured by stratagem. His dogs, arms, knapsack, and ammunition were taken from him, and in one of his pockets was found a small memorandum-book, in which he had recorded his dreams, and a design of settling permanently in the woods. In order to make this the more practicable and agreeable, he had drawn out a list of plants, the seeds of which it was his intention to procure. After enumerating various fruits and vegetables, he finished with a list of the flowers he hoped to obtain. That a man so execrable should retain a taste for

flowers, is a curious anomaly in the history of the human mind.

The philosophers living in the time of Philostratus (who records the fact) were accustomed to retire to the shades of Mount Athos,

“ Where Meditation
Might think down hours to moments.”

The Greek scholars, driven from the enchanting shores of the Bosphorus by the Turks, lamented the loss of the fine country they were compelled to quit next to the loss of their libraries, and the Apennines could alone compensate them for the region they had left. In this love of Nature they were equalled by the friends and companions of PETRARCH. To describe the satisfaction that elegant man enjoyed in his hermitage at Vacluse were impossible. Possessing a mental health superior to the contagion of all bad examples, he was never truly happy when away from it; he was never weary of celebrating its beauties, never fatigued with describing them to his friends.

To Vacluse, as he informs us in a letter to the Bishop of Cavoillon, he went when a child; there he returned when he was a youth; there in manhood he passed some of the choicest years of his life; and, had he been capable of reflection at so awful and so sudden a period, he would have lamented that he was not permitted there to close his mortal existence. Vacluse (*Vallis Clausa*) is a small valley, bounded by an amphitheatre of rocks, bold and romantic. The River Sorgia divides the valley. To the south is the Mediterranean; while at the feet of the rocks is an immense cavern, in which is a remarkable fountain. That Laura died unmarried is now, I should suppose, completely verified. She died in 1348, and was buried at Avignon. Her grave was opened by Francis I. of France, in which was found a box containing a medal, and a few verses written by Petrarch. On the medal was impressed

the figure of a woman ; on the reverse the letters M. L. M. J., signifying *Madona Laura morta jace*. The enthusiastic monarch returned everything into the tomb, and wrote an epitaph in honour of her memory.

The great discoverer COLUMBUS was peculiarly distinguished by his love of natural scenes.* Upon the death of her husband, Ferdinand, marquis of Pescara, VITTORIA COLONNA retired to the Island of Ischia, finely situated near the Bay of Naples, and gave herself up to the sorrow which the death of a man so deservedly dear to her could not fail to occasion. Her beauty and her merits attracted many wealthy and noble suiters, but she refused them all. Captivated with the beauty of the island, she listened to the inspirations of the muse, became the admiration of Italy, and was celebrated by all the literati of her time. In her bower, or walking on the seashore,

* "From his continual remarks on the beauty of the scenery," says his elegant biographer, "and from the pleasure he evidently derived from rural sounds and objects, he appears to have been extremely open to those delicious influences exercised over some spirits by the graces and wonders of Nature. He gives utterance to these feelings with characteristic enthusiasm, and at the same time with the artlessness and simplicity of a child."

To show that this observation is correct, let us adduce one remarkable instance "The beauty of Puerto Santo, and the clearness of the water, through which the sand at the bottom may be seen ; the multitude of palm-trees of various forms, the highest and most beautiful that I have met with, and an infinity of other great and green trees ; the birds in rich plumage, and the verdure of the fields, render this country, most serene princes, of such marvellous beauty, that it surpasses all others in charms and graces as the day doth the night in lustre. For which reason I often say to my people that, much as I endeavour to give a complete account of it to your majesties, my tongue cannot express the whole truth, nor my pen describe it ; and I have been so overwhelmed at the sight of so much beauty, that I have not known how to relate it."

* Vid. Irving's *Life of Columbus*. p. 271. I cannot refrain from saying that I think Irving's *Life of Columbus* the most beautiful biographical work of the present age.

she meditated most of those poems which have entitled her to such honourable mention among the most celebrated of the Petrarchian school.

POLITIAN celebrated the admirable scenes of Fiesole; and TASSO, whose celestial *tinsel* will delight an age when the bust of Boileau will only adorn a college, was born at Sorrento, the retreat of his father, situated amid the finest scenery in all Italy. Born in such a spot, he never lost that relish of Nature, which in many of the more unfortunate occurrences of his life was his chief and only consolation. At the villa of Zanga, in the neighbourhood of Bergamo, he revised his tragedy of *Torrismondo*; and while living in the court of the Duke of Ferrara, he was never happier than when he was invited by his princely patron to his retirement at Belriguardo, surrounded by gardens, and watered by the Po. He sleeps now beneath the orange-tree of St. Onuphrius. To love Tasso was to love honour, virtue, and genius. Even the monks of St. Onuphrius were sensible of his merit: they erected a monument, therefore, over his ashes. Melancholy, supremely melancholy are our reflections when we recall to mind that Tasso was neglected by fortune, and that he therefore permitted his imagination to exalt her standard over the ruins of reason. Boileau presumed to apply the epithet *clinquant* to this exquisite poet, without understanding a single word of Italian! Time, however, in its well-tempered crucible, has assayed this tinsel, and pronounced it gold.

ARIOSTO, who declared that he would not sell his liberty for the best cardinal's hat in Rome, and who confessed to his friends around his deathbed that he left the world without reluctance, since he felt assured that he should have the felicity of meeting many in the next world whom he had dearly loved in this—the richly-gifted Ariosto was equally an admirer of fine landscape. Many parts of his *Orlando Furioso*, therefore, are taken up in describing the

wild and romantic scenery in which several of the principal actions he celebrates were performed.

LEO X., also, was exceedingly partial to country diversions and rural scenery. His villa at Malliana at length became so delightful to him, that he seldom quitted it for Rome unless upon the most urgent occasions. His return was at all times greeted by the peasantry of his neighbourhood in the most enthusiastic manner. They met him in bodies upon the road; they presented him with flowers and fruits; and were happy beyond the common measure of felicity when the condescending pontiff accepted any of their rustic gifts. In return, he conferred upon them more substantial benefits; the old and the young partook alike of his bounty; upon the damsels he bestowed portions on the day of their marriage; and entered into conversation with his neighbours with the most fascinating condescension; esteeming, like Titus Vespasian, nothing more becoming a great and magnanimous prince than the sending every one from his presence contented, cheerful, and happy.

CERVANTES insists that solitude, agreeable prospects, and serene weather contribute so much to the fecundity of genius, that they enable the most barren mind to send forth productions worthy of captivating mankind.

It was amid the charms of Italian scenes that CLAUDE LORRAINE first elevated his genius to the contemplation of Nature. There he caught that poetic relish for beauty which enabled him to represent on canvass Nature in her most lovely and most captivating attire. And though the biographer of METASTASIO has neglected to notice it, it is not to be questioned but that the magnificent neighbourhood of Naples contributed in no small degree to overcome the resolution of that elegant man, when he bade, as he thought, an eternal adieu to poetry. He had wasted his fortune at Rome in unprofitable dis-

sipation, and had put himself under the care of the celebrated advocate Paglietti, with the firm resolution of resuming a profession he had long neglected. For some time he exercised the greatest tyranny over his own inclinations, till, by the entreaties of the Countess of Althan, he was persuaded to write an epithalamium on the marriage of the Marquis Pignatelli. To this succeeded the drama of *Endymion*, the *Gardens of the Hesperides*, and *Angelica*; till, captivated by this irresistible recall, and animated by the scenes which embellish the Bay of Naples, he again neglected the law, and gave himself up to his favourite amusement.

DANTE, a poet whose *Inferno*, *Purgatory*, and *Paradise*, Schlegel supposes (though we think very erroneously) not only to equal, but to excel the *Æneid* in strength, truth, depth, and comprehension—Dante, after many years' exile from Florence, received permission to return upon condition that he would confess himself guilty of the charge for which he had been banished, pay a sum of money, and ask pardon of the republic. His answer to this offer exhibits one of the finest specimens of heroic feeling on record: "Is such an invitation," said he, "glorious to Dante, after suffering an exile of almost fifteen years? Is it thus, then, that they would recompense innocence which all the world knows, and the labour and fatigue of unremitting study? Far from the man who is familiar with philosophy, be the senseless baseness of a heart of earth, that could act like a little sciolist, and imitate the infamy of some others by offering himself up, as it were, in chains. No! This is not the way that shall lead me back to my country. But I shall return with hasty steps if a way can be opened to me that shall not derogate from the fame and honour of Dante. But if by no such way Florence can be entered, then Florence I shall never enter. *What! shall I not everywhere enjoy the sight of the sun and stars? And*

may I not seek and contemplate, in every corner of the earth under the canopy of heaven, consoling and delightful truth, without rendering myself inglorious, nay, even infamous, to the people of Florence? Bread, I trust, will never fail me."

None of the poets of Italy, however, seem to have indulged a greater admiration of Nature than Alfieri. "When at Marseilles," says he, "it was my regular practice to bathe every evening in the sea. I indulged myself in this luxury in consequence of finding a very agreeable spot, on a tongue of land lying to the right of the harbour; where, seated on the sand, with my back leaning against a rock, I could behold the sea and sky without interruption. In the contemplation of those objects, embellished by the rays of the setting sun, I passed my time, dreaming of future delights." In Sweden he was charmed with the clear winter nights, when the stars seemed to have doubled their number and brilliancy. "Every scene in Bothnia," says he, "gave me pleasure. They were calculated to awaken fantastic, melancholy, and grand images, by a certain vast, indefinable silence which reigns in the atmosphere, making us feel as if we were out of the world."

COUNT HARRACH, of Vienna, born of a noble family and to a considerable fortune, devoted no small share of his youth to the acquirement of medical science, in order to dedicate his life to the service of mankind. After studying in many of the universities of Europe, particularly in those of Prague, Edinburgh, and Glasgow, he fixed his abode at Vienna, and devoted his whole time to the medical art, in aid of the indigent and distressed. He still lives; and, entering the poorest hovel, his entire fortune is expended in relieving the sick. His love of Nature alone divides his time, without diverting his efforts from the service of the meanest and most miserable of mankind.

Shakspeare's love of Nature is indicated in almost every scene he has written.*

MILTON, alive to the beauties of the external world, honoured Guarini by adapting his idea to the circumstance of his own misfortune : a passage which feelingly expresses his regret that he could no longer enjoy the smiles and graces of all bounteous Nature.

" Thus with the year
Seasons return : but not to me return
Day, or the sweet approach of even or morn,
Or sight of vernal bloom, or summer's rose,
Or flocks, or herds, or human face divine."

Milton has been supposed to have imbibed many of his ideas respecting landscape from Tasso, Spenser, Ariosto, and Italian romances. But a poet accustomed to the environs of Ludlow could want no adventitious aids to form a taste naturally elegant and refined. Nature alone was Milton's book !

After reading Comus and the pictures in Paradise Lost, how astonished are we at the assertion of Johnson, that Milton viewed Nature merely through "the spectacle of books!" And equally are our wonder and indignation excited when we read the passage where he says that Comus is "inelegantly splendid and tediously instructive." Mistaking allusion for description, this great moralist imagines Milton to call in learning as a principal, when he calls it in only as an auxiliary. Equally astonishing is the extreme apathy, I had almost said disgust,

* "No person can study his writings without perceiving that throughout the vast range of being, whatever is lovely and harmonious, whatever is sweet in expression or graceful in proportion, was constantly present to his mind ; that

"On every part,
In earth, or air, the meadow's purple stores,
The moon's mild radiance, or the virgin's form,
* * * he saw portrayed
That uncreated beauty which delights
The mind supreme.'"

* Drake's Memorials of Shakspeare, ii., 616, 410.

with which Johnson viewed the productions of the descriptive poets, and even the fairy landscapes of Nature herself. When in Scotland, he declared he had observed no scene so agreeable to his imagination as Fleet-street. In criticising Lord Lyttleton's poems, he says of his "Progress of Love" that it is "sufficient blame to say it is pastoral," forgetting that he had himself written the thirty-sixth number of the Rambler.

"Strange is it," says Beattie, "to observe the callousness of some men, before whom all the glories of heaven and earth pass in daily succession without touching their hearts, elevating their fancy, or leaving any durable remembrance." Thus the *Cingalese*, though in possession of flowers of the finest colour and most fragrant odour, never cultivate any of them. The *Kamtschatdales* often reproach their deities for having made their country so steep with hills and so deformed with rapid rivers; and the *Mongols* being asked why they did not cultivate their herbs and vegetables, replied that herbs were made for beasts, and beasts for men!

BERKELY, bishop of Cloyne, often declared that the happiest summer he ever enjoyed was in the small island of Inarine, near Naples, which he called the epitome of the earth. And what enthusiast of our nation is ignorant of the beauties, elegances, and virtues that adorned the best and most lovely woman of her age—ELIZABETH ROWE? There was not a flower, an insect, or a bird that grew, crept, or sung in her garden, which did not administer to her happiness.

Where do we read of a nobler character than that pride of his country and ornament of his age, Sir PHILIP SIDNEY? In that "warbler of poetic prose" were combined every quality which could adorn the soldier, and all the virtues which could elevate the man. No one so high who did not consider himself honoured by his friendship; no one so

low to whom he was uncourteous, or to whom he did not consider it a duty to show every kindness in his power. And though his *Arcadia* is deformed with Italian conceits and puerile descriptions, yet many are the passages in which he has indicated an ardent love of the sublime in sentiment and of the beautiful in landscape.

A greater lover of Nature never lived than **BACON**. When he read, he had music in the next room; flowers and sweet herbs stood upon his table; and when he was caught in the rain he would take off his hat, let the drops fall upon his head, and exclaim that he felt as if the spirit of the universe were upon him.

LORD LYTTLETON forgot the statesman in the bowers of Hagley; **CHILLINGWORTH** loved to meditate under the shades of Oxford; and that **AKENSIDE** possessed an enthusiastic love of Nature, his poem on the Pleasures of the Imagination sufficiently demonstrates. "Often," says he, in his Hymn to the Naiads, "often did the Muses reveal to me their secrets;

At noon
Or hour of sunset, by some lonely stream,
In field or shady grove, they taught me words
From power of death and envy to preserve
The good man's name."

GOLDSMITH, who bore the same resemblance to Rousseau that Rousseau bore to Tasso, was so eager to behold whatever was worthy of admiration in Europe, that, almost without money, he travelled over a large portion of France, Switzerland, and Germany on foot, and gained a subsistence as he went along by playing on the flute to the peasants, to whom his good-nature endeared him, and to the monasteries, to which he recommended himself by the vivacity and versatility of his genius. He often turned afterward with delight to the time when he so happily

"Led the sportive choir
With tuneful pipe beside the murmuring Loire."

ARMSTRONG has signalized his love of Nature in many a beautiful passage ; and SMOLLETT, whose genius was more adapted to the ludicrous than to the elegant departments of literature—even Smollett, as we may learn from a fine passage in his Ode to Independence, had a taste for rural contemplations :

"Nature I'll court in her sequestered haunts,
By mountain, meadow, streamlet, grove, or cell,
Where the poised lark his evening ditty chants,
And health, and peace, and contemplation dwell."

No one was a more ardent admirer of the bolder features of landscape than BEATTIE. The following passage is a gem extracted from a jewelled casket.

"O how canst thou renounce the boundless store
Of charms which Nature to her vot'ry yields ?
The warbling woodland, the resounding shore,
The pomp of groves and garniture of fields ;
All that the genial ray of morning gilds,
And all that echoes to the song of even ;
All that the mountain's sheltering bosom shields,
And all the dread magnificence of heaven ;
O how canst thou renounce, and hope to be forgiven !"

The late unfortunate COLLINS, gifted with an amiable disposition and a powerful imagination, therefore little qualified to play the cunning game of life, was also peculiarly susceptible to the grand and the beautiful. His Ode to Liberty testifies his love of freedom ; his Ode to Evening, the delicacy of his feelings and the elegance of his taste ; and how desirous he was of beholding the noble scenery of Scotland, the following stanza sufficiently demonstrates :

"All hail, ye scenes, that o'er my soul prevail !
Ye splendid friths and lakes, which, far away,
Are by smooth Annan fill'd, or pastoral Tay,
Or Don's romantic springs, at distance, hail !

The time may come when I, perhaps, may tread
Your lowly glens, o'erhung with spreading broom ;

Or o'er your stretching heaths, by fancy led,
 Or o'er your mountains creep, in awful gloom.
 Then will I dress once more the faded bower
 Where Jonson sat in Drummond's classic shade;
 Or crop from Teviot Dale each lyric flower,
 Or mourn on Yarrow's banks the widow'd maid!"

PORTEUS, bishop of London, was a lover of the more tranquil style of scenery; and being in the earlier part of his life presented to the rectory of Hunton by Archbishop Secker, he embellished his parsonage with all the elegance of a refined taste. To this spot he was devotedly attached, and even continued to reside there, for some months in the year, after his promotion to the bishopric of Chester. Never was there a better man than Dr. Porteus! And, for the honour of the age in which he lived, let him ever be distinguished by the title of the "GOOD BISHOP OF LONDON." To him are the slaves of Africa, in a great degree, indebted for the abolition of that monstrous traffic which continued so long a disgrace to this free country. He assisted in the formation of a society for their conversion to the Christian faith; he was a warm encourager of Sunday-schools, and an early patroniser of the British system of public education. As a master, he was so kind and indulgent that his servants shed tears over his grave; as a friend, he was ardent and sincere; as a preacher, so admirable in delivery, in language so elegant, in argument so striking, that a whole court hung with rapture on his lips. Only one spot rests upon the memory of Porteus: it is the following passage in his Poem on Death:

"War its thousands slays:
 Peace its ten thousands!"

To confound *peace* with *luxury* argues little of logic, and places a sword in the hands of the *hero* which that most excellent bishop could never have intended.

Germany has produced many genuine lovers of

Nature, and none more so than Goëthe, who, shortly before he died, called for paper, that he might express his delight at the coming of spring. France, too: Fenelon, the amiable and illustrious Fenelon, the tutor of princes and the shepherd of a flock was a strict observer and beautiful describer of Nature in all her serenity and elegance. How often has this archiepiscopal patron of those doomed to blush at the severity of their wants, sat on the grass with a group of villagers sitting around him: realizing in his practice the scenes of Elysium, which he had described with all the grace and tranquillity of a pure mind in his *Adventures of Telemachus*. In an age like this, how delightful it is to dwell on the memory of so wise and excellent a man; to meditate on the purity of his affections, the gentleness of his manners, and the nobleness of his sentiments; the richness of his imagination, and the refinement of his sensibility. Breathing love and friendship around him, and benevolence to all mankind; penetrating and conciliating every heart—we become enamoured of himself no less than of his genius.

THE INTELLECTUAL UNIVERSE.

AMONG the ARUNDEL MANUSCRIPTS is one written by Leonardo da Vinci (in his own hand), containing unconnected observations and demonstrations on subjects of mixed mathematics: viz., reflection, refraction, and optics in general; astronomy, gravity, motion, percussion, and the mechanical powers and forces, illustrated by diagrams and delineations. It is written backward in Italian. It is a most remarkable collection, having been composed a full age before the *Novum Organon*.

This manuscript reminded me of the monument

of Galileo in the Santa Croce of Florence, supported by the statues of geometry and astronomy; and also of the eloquent declaration of La Grange, that, had he been born to a fortune, he never would have studied the mathematics. It reminded me, too, of the circumstance that, though the mathematics may afford no great assistance to our search into Nature, it cannot be denied that they are of positive and indispensable use to confirm the knowledge of what has already been discovered.

Geometry renders even the Venus de Medicis an object for measurement, that is, of truth: yet Bosquet thought it totally useless in religion, and Fenelon even wrote to a ward, "Do not suffer yourself to be bewitched by the *infernal attractions* of geometry, for they will extinguish in you the spirit of grace." May we not say, the deeper the knowledge, the clearer the water; the shallower the knowledge, the more turbid and obscure?

Fontenelle has asserted that Newton never studied EUCLID, because his problems were too plain and simple, and therefore it was not worth taking up his time. This is absurd! Newton must have studied Euclid in the first instance. When he had mastered him, of course he studied him no longer. It is very easy to disdain our masters; but Newton never disdained Euclid. They were of a kindred genius; for they had both a very curious perceptive felicity in the art of demonstration, in common with Copernicus, Napier, La Grange, Condillac, and La Place.

The principle of analysis has been employed to pre-eminent advantage in a vast variety of instances; but some are disposed to believe that in many respects philosophers have endeavoured to carry it beyond its natural power. The Greek geometry, as pursued by Plato, Pappus, Euclid, and Apollonius, is, it is true, rigid and severe; but its beauty will ever prevent it from losing its attraction with the highest order of minds. Nor will the Calculus ever be able to destroy that taste.

Though the mathematics are essential to advancement in any of the higher departments of practical science, Gray was of the opinion that a knowledge of them is not absolutely essential to ensure maturity to the understanding. He thought that a fixed attention to any subject of deep reasoning might produce similar accuracy. He nevertheless felt their power in leading to a true knowledge of Nature, and therefore signified to a friend that, though late in the day, he should devote his mind to the study of them.

Mathematics open to genius a horizon so interminable as no imagination of man will ever be able to compass or explore. Notwithstanding this, mathematicians have never had any considerable influence on the manners or destinies of mankind. The power of poetry united to skill in mathematics is said nowhere to have been found; and Gibbon went even so far as to assert that the mathematics so harden the mind by the habit of rigid demonstration, as to destroy those finer feelings of moral evidence which must determine the actions and principles of life. But who does not know, on the contrary, that Euclid, Archimedes, Galileo, Napier, Newton, and Euler were not only in the first class as mathematicians, but also in the first rank as excellent men! For my own part, though I think the chief use of them is to strengthen the power of continuous thought, I conceive that no one can exalt his capacity for all good more than by adopting that course of education which will enable him to derive the best advantage from Newton's *Principia*, D'Alembert's *Calculus of Variations*, La Place's *Traité de Mécanique*, and his *Théorie Analytique des Probabilités*. And, since seven crotchets are sufficient to enable us to cause almost infinite combinations of sound, eighteen characters to express all our wants, sensations, and ideas, and nine ciphers to calculate numbers almost to infinity, truly

may it be said that the mathematics serve as a passage or an arch to true theology, and as a vestibule to a comprehensive knowledge of the Deity.

We must, however, remember that no nation has been redeemed from barbarism by the mathematics, and that Religion, Poetry, and the useful arts have ever been the means that have improved society, and held it together. Geometry, when applied to the higher objects of the universe, is, nevertheless, the most beautiful of the sciences, because it is the most perfect; the cultivator of it feeling in its study not only that he is right, but that he cannot be wrong.

It must nevertheless be conceded, that if the grandest object of an aspiring mind is to cultivate the nobler faculties in the highest possible degree, the mathematics are far from ensuring that great result; quantity only being its basis, diameter and circumference, height, width, and depth. Quality is unrecognised in its empire; the feelings have no exercise; the imagination—the noblest of all the faculties—no existence. It not only has no existence, but is not allowed to have any: the mathematician not only expels, but disdains it.

CUVIER assures us, that in an insect which he dissected, not one inch long, there were 494 muscles, 494 pairs of nerves, and 40,000 antennæ! Pythagoras might well say that a knowledge of numbers was a knowledge of Deity.

The number THREE is a remarkable number. Thus the CHALDEANS regarded it as being illustrative of *figure, light, and motion*; the EGYPTIANS, of *matter, form, and motion*; the PERSIANS, of *past, present, and future*; ORPHEUS, of *life, light, and wisdom*; the GREEKS, of the *God of Heaven, the God of Earth, and the God of the Sea*; the early CRETANS, of *life, cause, and energy*; and the HINDUS, of *power, understanding, and love*. With CHRISTIANS this number is illustrative of the Trinity, "Three Persons in One God."

The number **NINE** is so wonderful a number, that it might be employed as an emblem of the Divinity; for, *multiply* it in whatever shape we will, it has the astonishing property of resolving all the other numbers into itself.*

The number nine, too, has the remarkable quality of resolving other numbers, when joined with itself into themselves also.†

The Magi who were at Athens at the time of Plato's death, sacrificed to him, because he died at the age of eighty-one; figures which consummate a perfect number, viz., nine times nine.

Plato considered the number **TWELVE** to be an image of all-perfect progression, because it is composed of a multiplication of three by four, both which numbers the Pythagoreans considered as emblems of perfection. The number twelve has been a great favourite with the poets and philosophers. Plato's laws are in twelve books; also Virgil's *Eneid*, and Milton's *Paradise Lost*. SPENSER carried the preference still farther. "I devise," says he, in a letter to Sir Walter Raleigh, "that the Faërie Queene kept her annual feaste xii days; upon which xii several days, the occasions of the xii several adventures happened; which, being undertain by xii several knights, are in these xii books severally handled."

* 1	2	3	4	5	6	7	8	9	-
9	9	9	9	9	9	9	9	9	
9	18	27	36	45	54	63	72	81	

† 9	—	1	—	10	—	1
9	—	2	—	11	—	2
9	—	3	—	12	—	3
9	—	4	—	13	—	4
9	—	5	—	14	—	5
9	—	6	—	15	—	6
9	—	7	—	16	—	7
9	—	8	—	17	—	8
9	—	9	—	18	—	9

The number ELEVEN is remarkable, inasmuch as it is entirely unknown in BOTANY; botanical arrangements ought, therefore, to leave the number entirely out: thus, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, — 12, there being no flower that has eleven anthers or eleven pistils.

EUCLID, by connecting the elementary parts of geometry, as it were, in one circular chain, established the only perfect part of human knowledge. NAPIER invented logarithms; and so perfect did they emanate, that only one material improvement has been invented since, and of that improvement he had the honour of inventing a part; while TAYLOR, in one analytical formula, compressed a whole science into a single proposition, from which almost every method and truth of the new analysis may be deduced.

These instances appear to me to afford more striking examples of intellectual unity of power than any others with which we are acquainted, save one; for, though NEWTON's discovery of fluxions might seem to bear as great an analogy to intellectual unity as any of these, yet the simple circumstance of LEIBNITZ having nearly at the same time made the same discovery, proves that the road leading towards the invention had been so opened that two persons, to use a homely expression, could walk abreast.

But, there is a more remarkable instance of intellectual unity than even these. JOHANNES, well known in Trinity College, Dublin, was nearly blind, and yet he could answer the question as to the day of the week on which any day of the month fell in any year, whether in the new or the old style, *instantly*; and BERTON, the calculating peasant, could give the product of any arithmetical question by the simple operation of his mind as well as the best calculator could with his pen, and this, too, after employing a circuitous method.

These are extraordinary instances; but that of

BIDDER, the calculating boy, has in it so much of the wonderful, that to me he appears the greatest phenomenon in the history of mind.

The most wonderful things are related of this boy's arithmetical genius ; but he has never yet been able to explain the method by which he solves the various questions that have been proposed to him. In reference to these, one would imagine (says an elegant writer) that, "by some peculiar organization of his brain, a ray of omniscience had shot athwart it, giving us a glimpse of its Divine origin ; as when the clouds are opened by lightning, we appear to get a momentary insight into the glories of heaven."

PASCAL invented an instrument for facilitating arithmetical processes ; LEIBNITZ two. These reached from addition and subtraction, with some difficulty, to multiplication and division. BROWN'S Rotula Arithmetica was more simple, but it went no farther. What was wanted in these instruments will, it is hoped, be supplied by one invented by a philosopher of our own times (BABBAGE), who, by substituting a mechanical operation for a mental one, is endeavouring to relieve the progress of science of what has been aptly styled "the overwhelming incumbrance of numerical detail."

The mind has been deemed to be that which feels, thinks, wills, hopes, fears, and desires ; and some philosophers insist that we have the same evidence for its separate existence that we have for that of the body. Though this may be very difficult to *prove*, I cannot but *feel* (conscious as I am that no evidence can ever be derived from anatomy) as positively assured of the existence of my own mind separate from the body, as I am of the existence of steam, before it is applied to the turning of an engine. Added to which, I cannot but think that nothing is more instinctive of a God than the mental faculties of man. Man nevertheless wants other organs than he yet possesses to enable him to see

a thousand things. He connects, as it were, two worlds, his present life being the mere bud of his future being.

The seat of the intellectual powers has been variously supposed to be in the pineal gland, or the cerebellum; in the vapour of the cerebral cavities; in the aqueduct of Silvius; in the heart; in the stomach; in the corpora striata; and in the commencement of the spinal marrow. Some have placed it in the great commissure of the brain, others in the cavities of the brain, and some in the cerebral membranes; but Pythagoras, Galen, and, above all, Haller, supposed it to be seated in the brain itself. Let the mansion of the mind, however, be where it will, the mind itself eludes research.

The history of the mental philosophy of an age has been, for the most part, little better than the condensed essence of man's credulity; and this reminds me of Garofolo's picture of St. Augustine's vision. The saint dreamed that, as he was meditating by the seaside, he saw a child sitting on the shore with a table in his hand, who told him it would be as easy to empty the sea with his table, as it would be to penetrate the sublime mystery of the Trinity. This appears to me not wholly inapplicable to the science of METAPHYSICS, if that can be called a science in which all is conjecture.

Simonides made an excellent remark: "There is but one metaphysician, and that is the Being who formed us." We must, indeed, consider it no other than

"As a region all unknown,
Having treasures of its own,
More remote from public view
Than the bowels of Peru."

The study of METAPHYSICS is divided into two parts. The *first* is directed to examining the faculties, operations, essence, and powers of the mind, with a view to discover and explain the limits of moral and phys-

ical action, and the point of transition that exists between them. The *second*, beginning with external objects, endeavours to arrive at the same point of transition. The one may be called the science of thought, the other of sensation. The one glides from mind to matter, the other from matter to mind. The point of connexion and union is nevertheless as yet undiscovered.

We may attempt to ascertain the laws which regulate the connexion between mind and matter, but we are constrained to leave untouched the manner in which they are united. In every region of Nature we recognise matter; in all the regions of Nature, too, we behold the effects of powers which seem as if they cannot belong to what we call matter. But there we stop.

Sensation and reflection appear to be the foundations of all knowledge, and perception the first step towards it, as well as the inlet of all its materials. But, though sensation and reflection seem to be the foundations, as it were, of all we know, or possibly can know, in this sphere of existence, they do not enable us to form any positive idea in respect to infinite number, infinite expansion, infinite duration, infinite presence, infinite knowledge, or infinite power.

Before we can expect to have even the most remote idea of these, or any one of them, we must possess all the faculties of man simultaneously combined in us: attention, perception, consideration, reason, and reflection; discrimination and discernment; investigation, conception, contemplation, and abstraction; imagination, comprehension, judgment, and concentration, all in unity! It is sufficient for us to know that the great business of life is what Antoninus says of it—to improve our minds and govern our manners; since we are born, doubtless, for a more enlarged theatre, and carry (as Massillon so finely expresses it) on our very hearts “the

indelible title of our origin." In bearing the burden of life and ignorance, let this be our consolation.

As seamen voyaging between the tropics behold of a calm night a long line as of fire in the track through which their ship has ploughed her way—now brilliant and dazzling, like diamonds, and now steady and mild, like a vast profusion of pearls—so let the hopes of a future existence, and the assurance of an eternal and all-beneficent Creator, illuminate our path through this dark and troublous scene, light us through the gate of death, and finally lead us, free and renewed, to the TEMPLE OF THE LIVING GOD. We are all instruments in his hand to effect designs, of the final purposes of which we can form no probable conception.

Dreams.—Sleep is one of the most agreeable of Nature's boons :

" How sweet, thus lifeless, yet with life to lie ;
Thus, without dying, oh how sweet to die."

Not only ourselves and all animals sleep, but plants also. Thus the lotus of the Euphrates sinks below the water at night, and, rising above the surface, expands its blossom when the sun returns.

The Spartans were accustomed to place the image of Somnus near that of Mors. To lie down tranquil ; gradually to fall into a state of helpless existence ; to pass at intervals a third part of our whole lives in that state ; to wake from it, and again become active parts of life and matter, is, indeed, one of those miracles of continuity which mark the power and beneficence of the great Creator. And yet, from its frequency and regularity of occurrence, this astonishing phenomenon excites neither surprise, notice, nor gratitude ! We rest like the wheel, and like the wheel are again set in motion, careless and thoughtless as to what lulls us into rest or rouses us into action.

Porphyry says (in his epistle to Arebo) that in sleep he was enabled to obtain a knowledge of fu-

ture events. This was the belief of his age ; and it reminds one of Franklin's having once discovered in his sleep the bearings and issues of certain political events which had baffled his sagacity when awake. Condorcet, too, is said to have had presented to him in a dream the final steps of a difficult calculation, which had greatly embarrassed him during the day.

Most persons despise dreams ; yet it is very certain we sometimes dream of that which is useful to us when awake, and that dreams constitute one of the most important phenomena in the philosophy of mind.

Pausanias says that *Æschylus* applied himself to tragedy in consequence of being exhorted to do so in a dream ; that he was himself deterred from giving an account of the Eleusinian temple at Athens by a vision ; and that *Socrates* dreamed that a swan without wings sat on his bosom ; that it soon acquired wings, and soared into the sky. *Plato* had a dream still more extraordinary ; for he dreamed a short time before his death that he *appeared to himself*.

Cullen supposed—and he was, I believe, the first who did so—that the organs of sense sleep successively, and with different degrees of intensity. *Cabanis* entertained the same opinion, the organs of sight, according to him, falling asleep first ; then those of taste, smell, and hearing ; and, lastly, those of touch.

Dr. Phillip says that the peculiarities of dreaming arise from the partial operation of the causes of disturbance, and some of the sensitive parts of the brain being capable of excitement without disturbing others. " And thus it is," continues he, " that the nearer we are to awaking, the more rational our dreams become, all parts of the brain beginning to partake of the excitement, which has given rise to the adage that morning dreams are true."

Cleon and *Thrasymenes* are stated never to have dreamed in their lives. *Plutarch*, who records this,

was occasionally credulous ; and I should have hesitated in believing so remarkable a circumstance had not Mr. Locke assured us that he knew a gentleman who was bred a scholar, and had no bad memory, who told him that he never once dreamed till he had attained his twenty-sixth year. Herodotus and Pliny, however, go still farther, for they speak of a *whole people* (in Africa) who never dreamed, and, therefore, could not be made to understand how others could: It is nevertheless quite incredible that Nature should have denied to a whole people what she has given not only to dogs, cats, pigs, and horses, but even to birds.*

One reason why dreams are so little understood arises from the circumstance of their being permitted to be fugitive. Were we to give them "local habitation" by placing them on record, *something*, after a series of observations, might perhaps be elicited relative to the general construction of mind, and its dependency or independency of what is called matter. It would be well, then, were persons of different ages and countries to record certain of their dreams, preliminary circumstances, and also remarks relative to the impressions which those dreams leave on their senses.

De Thou frequently recorded his dreams, as did Archbishop Laud many of his.† Zimmerman, also :

* Beckstein says, "A bullfinch belonging to a lady, being subject to very frightful dreams, which made it fall from its perch, no sooner heard the affectionate voice of its mistress than it became immediately tranquil, and reascended its perch to sleep again."

I have a dormouse which passes much of his time in dreams. He is a beautiful little creature, with brilliant eyes and mild manners, and I should exceedingly like to know what it is he dreams about.

† Two of them are curious. "Dec. 14. I did dream that the lord keeper was dead ; that I passed by one of his men, that was about a monument for him ; that I heard him say his lower lip was infinitely swelled and fallen, and he rotten already." "March 8. Dreamed that I was reconciled to the Church of Rome. This troubled me much."—*Diary*.

one of which—on the state of the soul after death—he published in the *Journal de Zurich*. Lord Bacon, too, says that, being at Paris, and his father dying in London, two or three days before that event he had a dream, importing that his father's house was plastered all over with black mortar.

Byron, also, was once in the habit of noticing his dreams; and he did this, we are told, partly for his amusement, and partly to see if any picture could be made out of them. "It made a book," said he to an American who called upon him in Italy, "and it read very strangely, yet helped me to some ideas that have told well in poetry." He then remarked, "No man can tell what tags, and jags, and hints may not be picked out."^{*}

Philosophers dream as wildly as other persons; and this reminds me of the well-known German philosopher KANT. He appears to have been troubled with dreams beyond most men's imagination; for Wasianski informs us that they were absolutely appalling, and that single scenes or passages in those dreams were sufficient to compose "the whole course of mighty tragedies." They alarmed him, however, so greatly at times, that his servant often caught him out of his bed, endeavouring to escape to some other part of the house.

I will now mention some of my own dreams. My mother had been dead more than five-and-thirty years; and, though I remembered her figure, man-

* *Plautus* represents a sick merchant causing himself to be carried to the Temple of *Æsculapius*, in the hope of dreaming of some remedy; and we learn not only from *Plutarch*, but *Pausanias*, that the ancients frequently slept in the temples in order to have agreeable dreams. Even the magistrates of *Sparta* did the same, and that in the hope of receiving important revelations. Deare, the sculptor, doubtless remembered this; for he died in consequence of having stretched himself all night upon a block of marble, in order to avail himself of any dream he might have; "knowing," we are told, "how inspiring such suggestions have been to men of the highest talent!"

ners, and almost everything about her, I had entirely forgotten her countenance. This countenance I recovered in a dream, from which it would appear as if the mind were more perfect occasionally in dreams than when awake.

One night I thought I was walking in the dark through a lane overhung with bushes and high trees, between the village of TRETOWER and a beautiful little farm, called LANDEGAMMON VACH, I once possessed in right of my wife. As I passed along, I heard a voice over the hedge as from one who knew me, and whom I had known in former years. He came striding over the hedge into the lane, and said, "Walk by my side." I immediately did as I was commanded. "You are in very great trouble," said he, in a placid tone, "and have been so for many years. It is necessary." "Necessary?" "Are you not engaged in a great enterprise? I know you are! You have undertaken an unlimited subject. You can only know a small part of that subject unless you undergo great trials and see men in a multitude of attitudes. If you were at ease, nothing would strike you; all things would appear monotonous; they would have some surface, but no depth. Make up your mind, then, to undergo whatever Fortune may be pleased to impose upon you, and that with cheerfulness." So saying, he disappeared, and my dream vanished.

I have related this address with strict fidelity, for the impression was so vivid as to be stamped indelibly upon my imagination and memory. It struck me the more when I awaked, because it recalled to my memory that affecting passage in a letter from Columbus to Ferdinand and Isabella, where he relates a dream he had on the sea, in which a celestial voice encouraged him to go on, though in the midst of a tempest. His dream invigorated him; mine also invigorated me.

Though sorrow keeps most persons awake, it has

never that effect upon me ; the deeper the sorrow, the deeper the sleep. Heliodorus seems to have enjoyed the same luxury ; for he often says in his celebrated romance, "*Oppressed with sorrow, they fell asleep.*" In St. Luke, too, it is written, "When he rose up from prayer, and was come to his disciples, he found them asleep for sorrow." This is so true to Nature, that men are frequently known to sleep well, though doomed to execution in the morning, of which Charles the First and Louis the Sixteenth were memorable examples.

Some persons are peculiarly unfortunate in their dreams, especially those who believe in portents, ghosts, dragons, and enchantments :

" In dreams they fearful precipices tread,
Or, shipwreck'd, labour to some distant shore ;
Or in dark churches walk among the dead :
They wake with horror, and dare sleep no more.'

The most voluminous writer on this subject in ancient times was ARTEMIDORUS of EPHEBUS, who lived in the reign of Antoninus Pius. ALEXANDER AB ALEXANDRO, too, relates many remarkable particulars relative to the art which JUNIANUS MAJUS of Naples pretended to possess. Sannazario was a pupil of his ; and that poet declares concerning him that he surpassed all the augurs of ancient Rome. But the most curious work on this subject is one rendered into Latin from the Greek (whence it had been translated from the Arabic), "*On the art of Interpreting Dreams,*" according to the doctrine of the Indians, Persians, and Egyptians : a book which reminds me of a person who many years ago published a work on dreams, all of which,

" Without a gloss or comment
He could unriddle in a moment "

To judge by his manner and conversation, he really believed what he had written. Some of his rules, many years after, a water-doctor in the county of Monmouth did me the honour to select and recom-

mend to my especial attention.* “Now,” said I to the village interpreter, “if you will construe the following dream, I shall be infinitely obliged to you : I thought I was standing on a precipice overlooking the waterfall in the neighbourhood of Ffestiniog. The Irish Sea stretched itself to the west, and barren mountains to the east. The moon rising gloriously over Cader-Idris, I was struck with wonder and admiration to see the transparent part of it separate from the dark part, one falling gradually towards the Lake of Bala, the other towards the Irish Sea. At length the bright part assumed a rising attitude and remounted to the meridian, while the dark part fell beyond the earth into space, and was seen no more. The disk now increased in brilliancy every moment, and rose higher and higher ; when, obscuring the constellation of Orion, a multitude of smaller moons emanated from the larger one, like stars, till they became too small for the eye to discern.” “It is, of all dreams I have interpreted,” answered the worthy disciple of Junianus Majus, with solemnity, “the most extraordinary—it is even sublime ; but I cannot choose to tell you what it means.”

With this answer I was compelled to be satisfied. Some time afterward, however, he made bold to tell

* “To dream you *see* an angel is good ; but if you dream that you *converse* with one, it is evil.

“To dream you bathe in a clear fountain denotes joy ; but in a muddy one, a false accusation.

“To dream you have a long, bushy beard proves you will one day be a lawyer, an orator, an ambassador, or a philosopher.

“To dream you have a black face is a sure sign of living to a great age.

“To dream of being ridden by a nightmare indicates that you will be domineered over by a fool.

“To dream of seeing an execution signifies a clear conscience.

“To dream of gathering up silver denotes loss and deceit.

“To dream that we carry wood on our backs denotes servitude—~~if~~ we be rich, and honour if we be poor.”

me that I should lose all my children, one by one, and their mother with the last, with whom they would all ascend to heaven at the same moment. He carefully suppressed, however, all knowledge in respect to the hope I expressed that I might be permitted to attend them. "All this," concluded he, "will happen to you in the course of two years." Five-and-twenty years, however, have passed over us since this awful prognostication, and, thank Heaven! we are still all alive.

The Mind in Ruins.—The next great step into the intellectual regions is perhaps to contemplate the mind in its moments of irregularity and decay.

In the tragedy of Ernst von Houvald (*The Light Tower*), an insane person is represented keeping watch upon the seashore in every storm, to recover from the waves the lost object of his affections. His harp is heard amid the dashing of the billows and the roaring of the tempest.

In the tragedy of Ethwald, by Miss Baillie, the insane Bertha answers to the question, "What is thy name, sweet lady?"

"I had a name that kind friends call'd me by,
And with a blessing did the holy man
Bestow it on me. But I've wander'd far
Through woods and wilds, and strangely on my head
The numbing winds have beat, and I have lost it.
Be not offended with me."

There are few passages, even in Sophocles, more affecting than this.

The mind of man can only be perceived by the effects of its activity, as air is sensible to the touch only when it is in motion. Some men are insane upon one subject, and rational on all others: the rapidity with which they associate is wonderful.

Spurzheim describes a curious phenomenon, viz., a man who, being insane on one side, observed his insanity with the other. He says, also, that Gall attended a patient who heard reproaches on his

left side, and that he would turn his head to look at the persons he supposed to be uttering them; and that with his right side he commonly judged the madness of his left.

A short time since, a person named Knott summoned a schoolmaster for having in his possession a weasel, which, he said, knew all his thoughts, and haunted him by declaring them night and day. A gentleman also destroyed himself lately, under the impression that he was watched by a person sitting on the roof of his house; and his fear at length became so great, that he could not be persuaded to examine whether his imagination were true or false. To escape from this fancied espionage he rushed to the grave.

This circumstance brings to my mind the death of Gilbert, author of the Hurricane. His last words were, "I cannot govern myself!" an instance to prove that genius and madness may exist in the same person side by side. "I knew him," says Southey, "and look back with melancholy pleasure to the hours which I have passed in his society when his mind was in ruins. His madness was of the most incomprehensible kind, as may be seen in the notes to the Hurricane; but the poem contains passages of exquisite beauty."

From the registers of the Bicêtre, it appears that the insane patients confined there consisted almost entirely of priests, artists, painters, sculptors, poets, and musicians. There was not one instance of the disease in naturalists, physicians, geometricians, or chymists.

Insanity is far from being always a state of pain and unhappiness. It is sometimes one of positive pleasure. Pinel assures us that he has often stopped at the door of a patient who, during his paroxysms, appeared to soar far above the mediocrity of intellect which usually distinguished him; and Dr. Willis states that one of his patients was accus-
tomed.

ed to expect his paroxysms with impatience, since he enjoyed in those moments a high degree of pleasurable excitement. His mind, too, was at those times far superior to what it was during his intervals of sanity. Could a mentally-disordered person write a history of his pains, pleasures, and thoughts, what a curious yet awful picture would it present? And this reminds me of what the Princess Elizabeth wrote to the Countess of Suffolk in regard to her father, George the Third: "If anything can make us more easy under the calamity which it has pleased Heaven to inflict upon us, it is the apparent happiness my revered father seems to feel. He considers himself no longer an inhabitant of this world; and often, when he has played one of his favourite tunes, observes that he was very fond of it when he was in the world."

Somewhere about six-and-twenty years ago, I saw rambling on the Brynn Mountain (in the district of Gower) a tall figure, who in one respect resembled the unfortunate girl so affectingly described by Bloomfield:

"She pluck'd a tender twig from every bough,
To whip the hovering demons from her brow."

The history of this unfortunate creature was this: She lost her husband and her two sons at sea, they having sailed in the same ship. This dreadful occurrence having been abruptly communicated to her, she never enjoyed her reason afterward.

The history of this unhappy person calls also to my recollection that, in the lunatic asylum at Toledo, my friend Philotus saw a female seated near a window, gazing on the sky. Her history was this: Having been to a village near Murcia to sell dates, on returning home, to her inexpressible horror, she saw the earth open (an earthquake), and swallow up her cottage, husband, and children. They sunk from her sight in a moment! From that time she was

never known to speak; and her whole time was passed at the window of the asylum, with her eyes turned to the sky, from which position she was forcibly drawn to her meals and her bed.

Female madness has been exquisitely personified by Shakspeare, Fletcher, Cowper, and Bloomfield. No poets have exceeded them. What a melancholy picture, too, is that of "*Silly Simon*," by that stern anatomist, Crabbe!

Zimmerman, in his treatise on Experience in Physic, relates, that when he visited the great hospitals in France, he distinguished in them three kinds of insane persons. "The men," says he, "had become so from pride, the girls through love, and the women through jealousy." I alluded to this one day to a medical friend, who, in return, told me that, in his opinion, insanity was a partial and not a total aberration of reason, and that there are as many mental causes for it as there are passions. "The best remedy for all which," continued he, "is kind treatment, constant occupation in the way of exercise and amusement (which induce sleep), and, where it is possible, religious arguments and instruction. The last, however, is exceedingly difficult, for, for the most part, they turn a deaf ear to all arguments and representations of that nature."

It is related in the Memoirs of Baron de Grimm, that a person in the lunatic asylum at Zurich had only one happiness, and that consisted in ringing the bells of the church. Growing old, he was not allowed to perform this office any longer, and he was, in consequence, reduced to despair. But at length summoning resolution to appeal to the master of the works, "I come, sir," said he, "to ask a favour of you. I used to ring the bells—it was the only thing in the world in which I could be useful—but they will allow me to do it no longer. Do me the favour, then, to cut off my head. I cannot do it myself, or I would spare you the trouble." Now I think this

man was much less insane than he who takes pleasure in ravaging countries, sacking towns, and strewing fields with bleeding corpses.

Sir George Baker wrote a work on the influence of some of the passions on the mind and body, and on the diseases to which those passions give rise. A counterpart of this picture is still wanting, viz., one describing the effect of bodily diseases on mental affections. I am not aware that there is any adequate work in this department of physiology.

Treated with skill and feeling, nothing in the medical science is dry or repulsive ; every phenomenon having its interest and attraction. Can this be said of the practical superintendence of insane persons ?

A rich, unfortunate gentleman died lately in our neighbourhood. He was a martyr to that mental stillness of which Dante complained in his youth, attended by an unconquerable despondence. He was enchained, as it were, and all his sensations became at last so exaggerated, that he was an exemplar of that species of melancholy which Austin calls "the cream and quintessence of human adversity." He nevertheless derived great pleasure from music. One day, also, he would be seen working on the highway, like a labourer ; on another, picking sticks along the hedgerows : now he would be gathering leaves, now standing with eyes fixed on a horse, a sheep, a cow, or a cloud ; now gazing on the water, and now measuring a path. He had a fine collection of exotic plants. In a few weeks all would be cast on the dunghill, and succeeded by some of the most common of our own. Sometimes his house was all elegance ; a year or two after it would be all desolation, the walks matted with grass, the trees covered with moss. With these exceptions, he had an elegant and enlightened mind ; which was at times, however, so conscious of its irregularity, that he would weep from the dread of becoming insane.

DODSLEY told WARTON, with tears in his eyes, that, sitting by POPE's bedside a short time before his death, POPE inquired what great arm it was he saw coming out of the wall. POPE, however, never laboured under the fear of insanity. COLLINS, too: "What becomes of my poor dear Collins?" inquired JOHNSON, in a letter to Warton. "That man is no common loss. The moralists all talk of the uncertainty of fortune and the transitoriness of beauty; but it is more dreadful to consider that understanding may make its appearance and depart; that it may blaze and expire." In reference to himself, too: "When I survey my past life,* I discover nothing but a barren waste of time, with some disorders of body and disturbances of mind very near to madness, which I hope HE that made me will suffer to extenuate many faults and excuse many deficiencies." JOHNSON had a great dread of his mind falling into ruins. BRADLEY, also: he who discovered the apparent motion in the fixed stars called the aberration, and the causes of several other phenomena; he was placid, and indifferent to wealth, honours, and fame; yet, keeping his mind too much in a state of studious exertion, he became, during the latter part of his life, afflicted with a terror of losing some of his faculties. From that calamity, however, he escaped. SWIFT was less fortunate. He greatly feared such a terrible visitation; and, as a relief for others, established a hospital for lunatics. Lord Byron, also, was greatly apprehensive of this calamity; and this he alludes to in one of his letters: "I presume that I shall be in the end, if not earlier, like Swift—dying at top! I confess I do not contemplate this with so much horror as he apparently did some years before it happened."

Byron, with all his great powers, was an unfortunate man. In the hands of a Fenelon he had perhaps surpassed human nature; under the govern-

* Johnson's Prayers and Meditations, p. 155.

ment of himself, he developed the strength and the imbecilities of boyhood, manhood, and age. The greatest of his misfortunes seems to have been, that he associated with scarcely one mind that was not inferior to his own.

Remove the force that bends the sword, and it recovers its straightness as if it never had been bent; and watch-springs retain their elasticity at the distance even of a hundred years. But it is not so with mind :

“ E'en as a broken mirror, which the glass
In every fragment multiplies ; and makes
A thousand images of one, that was
The same, and still the more, the more it breaks :
And thus the heart will do, which not forsakes
Living in shatter'd guise, and still, and cold,
And bloodless, with its sleepless sorrow aches,
Yet withers on till all without is cold,
Showing no visible sign ; for such things are untold.”

Purcell was greatly pleased with setting mad songs to music : a circumstance accounted for by the scope which they afforded to his genius of expressing the strongest passions in their most unrestrained form.

Five or six days ago, walking near the new church in Woburn Square, we saw an elderly gentleman looking earnestly at the trees and shrubs. At length, turning round, and seeing us gaze rather intently upon him, “ Pray, sirs,” said he, “ will you be so *humane* as to tell me really the truth ? Am I in a state of real existence or not ?”

“ Certainly, sir,” answered the friend with whom we were walking, “ you assuredly are.”

“ I thank you, sir,” replied the old gentleman, with a slight bow. “ I have been confined ever since I lost my Jane, and that is now, I suppose, five years ; and ever since, that is, *to-day*, now I walk out, nothing seems to me to be real. I feel as if I could not settle my mind as to the true existence of what I see. I thank you, sir ; I will no longer intrude upon you.”

Saying this, he walked slowly away ; and then we perceived that a person was engaged watching him, near the north end of the square. Unhappy man ! thy intellectual life appears to come and go like night and day, summer and winter. There is nothing, I think, so wonderful in this disorder as its lucid intervals and quick returns.

In a small town, situated in one of the most beautiful valleys in Wales, lived a clergyman, possessed of a cultivated mind and taste. I was married by him to a lady who was his parishioner : shortly afterward he remarked to me that he had arrived at the summit of his hopes, and had not a single thing to wish for. I made no answer, but mentally exclaimed, "Then you soon will have !" Years have passed away since this confession. To-day something occurred to render us anxious, and we went into the nursery-plantation in front of our house, and amused ourselves with looking at the myriads of spider's webs that hung from branch to branch, and rescued a multitude of flies and bees that were entangled in them. On returning, we met a friend just arrived from the part of Wales where this clergyman lived, and he informed us that he had lost his wife, and was himself in a house for the confinement of lunatics ! Let the happiness of to-day be what it may, who can foretell the vicissitudes of the morrow !

Euripides described madness in a very masterly manner ; and for this he is greatly celebrated by Longinus. No poet, indeed, was ever more deeply skilled than Euripides in the pathology of the soul. The madness of Medea is dreadful ; that of Hercules awful ; while the picture of Orestes, begun by Æschylus and finished by this poet, is one of the most sublime the imagination has ever figured to the mind. There is, I believe, nothing equal to it in the whole compass of human thought.

Shakspeare, too, has shown himself not only a master of the sublime, but also of the pathetic, in this most awful department of human ecstasy.

" O let me not be mad—not mad—sweet Heaven !"

Thus Lear : but in King John :

" My name is CONSTANCE ; I was Jeffrey's wife ;
Young Arthur is my son, and he is lost.
I am not mad ; *I wish to Heaven I were !*
I am not mad ; too well, too well I feel
The different plagues of each calamity."

I quote these passages, not as illustrative of madness itself, but of the horror entertained for it by some, and the refuge which it promises to the imagination of others.

The Romans, heartless in most things, esteemed insanity sacred ; the moderns, humane in most things, regard it, for the most part, with contempt :

" This, of all maladies that man infest,
Claims most compassion, and receives it least !"

Nothing is yet known of the principle of mind : all is conjecture. All, therefore, man can do, is to study the capacities and modes of action it exhibits in its shape of bodily combination. Esquirol, Pinel, and Haslam even assure us that the mental functions may be a total wreck, and yet the most profound medical practitioner would not be able to detect the slightest derangement of structure. From this it is argued (and with no small share of logical analogy) that no evidence in favour of the materiality of the mind can be drawn from pathology.

Whether the brain be an organ or an aggregate of organs is of no importance to this inquiry, the brain being only the (probable) *seat* of the mind, and not, as some would insist, the *organ* of the mind. Neither the brain, nor the heart, nor the visual nerve, is sensible to touch ; pain, therefore, does not arise from those organs, but from the parts which surround and protect them.

The Eye is guarded by a nerve which covers all its exterior surfaces, and gives to them intensity of sensation. By this the nerve of sight is protected ; because, being itself insensible, it has no power of

guarding itself. The **HEART**, too, is insensible. It is nevertheless affected by every change, whether of the body or of the mind, being in perpetual sympathy with both. The **BRAIN** also may be touched; nay, a portion of it may even be separated from the rest, and yet the patient remain not only insensible to the loss, but unconscious of the wound. Anatomy, then, as before observed, affords no insight whatever (at least at present) in regard to the structure and functions of the mental faculties.

The mind is doubtless as distinct from the bodily organs as are the exterior influences which call them into action. The manner in which sensation is propagated and the mind influenced is totally unknown. That the mind is influenced by what is taken into the bodily system can be, nevertheless, proved in a moment, viz., by the admission of opium or brandy. The mind is shown by this to be, as it were, married to the body; and here, I believe, all real knowledge ceases.

Four or five years ago I visited a private asylum for lunatics. I was ushered into the drawing-room, and drank tea with a large party of ladies and gentlemen, two of whom were highly educated. One said he had climbed Teneriffe; and the other, the Ghauts, and several peaks among the Himalayas. These might have been mere boasts or fancies; but they distinctly showed that they were intimately acquainted with Tasso and Ariosto, and one was even conversant with Dante. After tea one of the ladies sang, another played, and all entered occasionally into animated discourse. The friend whom I went to see, however, kept aloof, not being in good-humour. As I was going away, the master of the establishment inquired how I had been entertained. "Never more agreeably," said I. "And yet," he replied, to my great surprise, "every one of those gentlemen and ladies (except my own family) are patients. This is the anniversary of my marriage,

and we invited them from their apartments to partake of our happiness."

In December, 1828, I was present at the investigation of a question relative to the sanity of a gentleman, named Rothwell, and I record it on account of the very extraordinary declaration of the patient : "I feel no hesitation in declaring, in the most solemn manner, my conviction, from the unerring light which glows within me, as well as from concurrent circumstances of another description, that this person who is here in the form of my attendant is no other than the *Divine Creator*!"

Bishop Watson observes, in a letter to Mr. Hayley, that disorders of the mind generally originate in a disordered body ; and Dr. John Hunter and M. Mongelloz insist that, strictly speaking, there are no hereditary maladies. That internal and external conformations are hereditary is nevertheless certain.

From the statements of M. Friedrich, it appears that the raving mad are more frequently cured than the melancholy mad, since to animate sensibility is less difficult than to moderate too great an irritability ; that raving madness is more prevalent in man, and moody madness in women ; and that the principle in both (in his opinion) is to be found less in the mind than in a deranged bodily organization. Both suffer, however, from fixed ideas : in men, derangements of the understanding are more frequent ; in women, derangements of the imagination.*

There are two remarkable things in insane persons. Those they formerly hated they admire and regard ; and those they once loved, they not only hate, but despise. They prefer, also, to be with those

* In 1789, Black found in Bedlam—insane from grief and misfortune, 206 ; religion, 90 ; love, 74 ; jealousy, 6 ; fright, 51 ; study, 15 ; pride, 8 ; drunkenness, 58 ; childbirth, 79 ; constipation, 10 ; hereditary complaints, 115 ; contusions and broken bones, 12 ; syphilis, 14 ; smallpox, 7 ; retrocession of the itch, and healed ulcers, 5.—*Friedrich*,

most of whom they stand most in awe : a circumstance which may probably be rightly ascribed to their being conscious of their condition, and from the satisfaction they derive from having a superior agent near them who can protect them from themselves, most insane persons being more fearful of themselves than they are of other persons.

Dr. Abercrombie regards insanity and dreaming as having a remarkable affinity. Erroneous impressions in **INSANITY** he considers as "permanent, and affecting the conduct ;" in **DREAMING**, "as transient, and not affecting the conduct." - In **INSANITY** "the senses are alive to external impressions," and "the motions of the body are under the influence of the will." In **DREAMS** the senses are in a great degree "closed against external impressions," and "the influence of the will upon the motions of the body is in general suspended."

The arguments employed to support this hypothesis are exceedingly ingenious. We ought, however, to remember that the author does not identify insanity with dreaming ; he speaks merely of their affinity. But to me insanity appears to be rather an *intermediate state between wakefulness and dreaming* ; a species of hallucination, as it were, disturbed by reality, and rendered observable to others by the force of volition, and the power of impulse and action.

The cure of insanity is beyond the province of my inquiry. It is sufficient for me to mention that the practice of insulating patients from relations and friends is recommended by Cullen, Willis, Pinel, Esquirol, and indeed, I believe, by all the more eminent English, French, German, and Italian physicians. What Spanish ones have recommended, we have no opportunity of knowing ; since, if I mistake not, no treatise of any authority has been of late years published in that language. I believe, however, that they have not yet reached the knowl-

edge that insanity is in some cases a bodily complaint; in others, a mental one; in most, a disease both of the mind and of the body. But whether the mind operates on the body in the first instance, or the body on the mind, is in most cases an exceedingly difficult problem to determine. I will here remark, that an entire absence of phosphorus from the brain would, in the opinion of M. Couerbe, reduce us to the state of quadrupeds; and that a great excess of it engenders excitement so violent as to resemble madness, if it does not even produce it.

THE TRIALS AND CAPRICES OF FORTUNE.

THE scholiasts number five methods of acquiring knowledge: observation, reading, listening, conversation, and meditation: they leave out the most important—suffering. But mere scholars, and men who have been rich from their birth, and continue so till the hour of their death, ought never to take so great a liberty with common sense as to suppose they have ever possessed a thorough knowledge of mankind. Felicity was deified by the Greeks and Romans; but they found her the most ungrateful of all the divinities. The Scythians represented Fortune as a woman having hands and wings, but without a foot to stand upon: yet many men think misfortune not only a disgrace, but a crime, till they come to be unfortunate themselves, and then they perceive the folly of asserting that every misfortune may be prevented by courage or by prudence. They find, too, that fortune not only triumphs over folly and imprudence, but over wisdom and virtue. Many worthy persons, however, seriously fancy their good fortune to be the result of their own management, when all they have to do is to sit still and keep themselves warm!

Fortune, in robbing a man of his property, is not always so cruel as she is represented ; for she frequently gives a noble pride of heart and peace of mind in place of it ; and these are shields, consolations, equivalents ; nay, more than equivalents—they are rewards ; for love and peace not unfrequently spring out of misfortune, as naturally as flowers from beds of lava.

They speak profoundly who say that the world is like a theatre, where the best judges are obliged to sit in the worst places. But they would speak more profoundly still if they were to add that the best judges, notwithstanding the badness of their seats, frequently enjoy the spectacle more to the comfort of their hearts than those who sit on velvet cushions.

“ Sweet are the uses of adversity ;
Which, like the toad, ugly and venomous,
Bears yet a precious jewel in its head.”

Misfortunes never assume so formidable a character as in their perspective : anticipation, like Iceland crystal, making every object appear double ; while faith in ultimate justice operates as a convex mirror, in which every object appears less. No man need feel ashamed of sorrow. Sophocles makes even Hercules sink beneath impressions of vicissitude. The man of virtue becomes sacred by misfortune, and every honourable mind feels disposed to address him as the courtiers of Caubul address the person of their sovereign : “ May your sorrow be turned upon me !”

“ Little do they think,
E'en in the vale where wisdom loves to dwell,
How many, rack'd with honest passion, droop
In deep retired distress !”

For there is a silent sorrow of the heart, which in some men, on some occasions, saps the very foundations of life. But the most delicious of fruits not unfrequently grow even among the sands of the

deserts ; and gold, the heaviest of metals, is so susceptible of expansion, that it can be wasted on the lightest breath of air. Bear up, then : the same decided contrast may be found in you. A masterly retreat is not less glorious than a brilliant victory ; for, borrowing lustre from vicissitude, the ardent risings of an unsubdued mind will point with confidence to the soul's great refuge.

"He that wrestles with us," says Burke, "strengthens our nerves and sharpens our skill. Our antagonist is our helper. This amicable conflict with difficulty obliges us to an intimate acquaintance with our subject, and compels us to consider it in all its relations. It will not suffer us to be superficial." Adversity is, indeed, the quickest and most unerring of tutors ; for she instructs more in weeks than prosperity teaches us in years. Can we exempt ourselves from misfortune ? We may as well attempt to weigh light in a balance ; to recall the day that is past ; to measure infinity.

Can we prevent the lightning from striking us ? the whirlwind from overwhelming us ? or the sea from swallowing our ship in the midst of a storm ? Let us be resigned, then, to a power we cannot control.

Men should take particular care how they hope ; since misfortune sometimes assumes the colouring of that fascinating quality, as if to make the ruin she meditates more certain and complete. For one man that despair ruins, hope ruins a hundred—nay, a thousand. The temple of Fortune was built of a species of alabaster so transparent, that even when the doors were closed there was sufficient light. Look up when you would aspire ; look down when you would be happy. When you would be humble, compare your virtues with those of men more virtuous than yourself ; and when you would be contented with your lot, look on those who toil for days, months, and years without an atom of reward.

We deceive ourselves much oftener than others deceive us ; for we are ourselves our own greatest flatterers. Yet in vain shall we look for twenty men who will acknowledge that they suffer more from want of ability or honesty than from want of opportunity.

Man is never so strong, nor the operations of his mind so effective, as when they are called into action by some great, overwhelming occasion ; and then Virtue is the best shield and bulwark of his nature. It throws a grace over every mental energy ; it gives beauty to grandeur, and tranquillity to passion. As to envy—who is there worthy of envy ! The fortunate have their imaginary evils, the unfortunate their real ones ; and whether real or imaginary are the easier to be borne, requires little skill in mental algebra to determine. As to the great—if you would know, without the trouble of experiment, what their extravagance and insensibility are, and what their wedded attachments to life, you have only to read the “ Tyrant ” of Lucian. Those whom we style “ great ” are only men placed upon high pedestals ; and seen from which, they are, Heaven knows, little enough ! In our early years we approach them with awe, and with an assured expectation that they possess something intrinsically eminent. But when we see them closer, how narrow their views, how frivolous their conversation, how violent their passions ! How reluctant are they to forgive, how sensitive are they to neglect, and how eagerly do they look for homage and respect : how do they burn for favours which only beggars ought to sue for ; and how impatient, how fantastically impatient are they at honours conferred upon an equal ! Rank ought to have much to give to compensate for the trouble and the misery it occasions.

Old men frequently complain how few pleasures they have been able to enjoy ; but they would make fewer complaints had they been susceptible of sim-

pler enjoyments. Fine feelings produce a multitude of fine enjoyments ; yet it must be confessed that a man of exquisite sensibility undergoes many martyrdoms.

Wisdom, however, is tranquil. The best inheritances a man can possess are heartfelt serenity and sedate fortitude ; as in the cold solace of society, a constant and legitimate sense of inward worth is the first of earthly consolations. The most beautiful object that can engage the imagination is that of a man living serenely in the midst of privations and tumults, as if he considered himself living for eternity.

When we behold age standing with one foot in the grave, and the other placed, as it were, upon an ingot of gold ; when we reflect how soon the season of life is over, and that no one hour of the past can ever contribute a single moment to the future ; when we behold the young and the beautiful withering in their prime, or feel ourselves the last survivor of many friends, after having seen the best of their wishes vanish in disappointment, and the last of their hopes melt into nothing, what awful views of Nature and of life are presented to the imagination ! When we look around us, and behold the pride, the envy, and the malice that oppress the general mass of mankind ; when we consider how many virtues society nips in the bud, and with what industry it punishes those virtues it is obliged in decency to commend ; when we see with what eagerness the feelings are insulted and the mind starved, and observe the seeming delight with which some men survey the wretchedness of their fellow-creatures, there is, assuredly, sufficient justification for the profoundest melancholy. When we pause upon the ruins of a countenance melancholy and meditative, whose only dower was independence of mind ; when the captivating bloom of youth has faded into ugliness, penury, and age ; when the electrical fibres of the heart are frozen by the touches of selfish indif-

ference ; and when experience teaches that wealth, and grandeur, and glory store up for old age an irritating horror of death, instead of picturing that transcendent change as with a magic wand converting the wrinkles of age

“ Into a blooming face,
On which youth shines celestial,”

there is, indeed, sufficient justification for the profoundest melancholy : but in that melancholy there is hope !

SMILES AND TEARS.

INFANTS appear to smile when only a few hours old ; but such an appearance is merely the effect of air upon the muscles. At the age of forty days children begin to weep : before that no tears accompany their cries. At that period, also, they begin to smile. Zoroaster and Cypselus, however, are strangely enough reported by Pliny and Herodotus to have burst into loud laughter the moment they were born ! Tasso never laughed when he was an infant, and seldom wept ; and he never liked laughing women : yet he wrote,

“ Within her humid, melting eyes,
A brilliant ray of laughter lies,
Soft as the broken solar beam,
That trembles in the azure stream.”

How many kind, how many outraged hearts are driven to the resource of laughing to conceal their tears ! How often have I witnessed this !

“ I saw thee ~~WERP~~ ; the big bright tear
Came o'er that eye of blue ;
And then, methought, it did appear
A violet, dropping dew.

I saw thee SMILE ; the sapphire's blaze
Beside thee ceased to shine ;
It could not match the living rays
That filled that glance of thine."

Thus sung LORD BYRON in his Hebrew Melodies ; and such a passage leads us the more to lament that he who sung them was at last fated to confess,

" That if he laughed at any living thing,
'Twas that he might not weep."

Some writers insist that man is the only animal that weeps. Others have supposed that seals, the camel, the small American monkey, doves, deer, and giraffes shed tears ; the two latter being furnished with two *spiracula*, analogous to the *puncta lachrymalia* in the human head. It would have been fortunate for animals if they could weep like men ; for then, perhaps, we should pity them more, and use them better.

Pliny calls man a weeping animal ; and Pope argues that compassion is exclusively the property of man. This, however, may perhaps one day be questioned.

Tears are very eloquent. When the King of Prussia and the Emperor Alexander met after the disasters of the French at Moscow, the king wept. " Courage, my brother," exclaimed the emperor, " these are the last tears Napoleon shall cause you to shed."

Even HENRY VIII. was not entirely insensible. When, therefore, he read QUEEN CATHARINE's last letter, in which she said, " I make this vow, that my heart desire you above all things," the savage melted into tears ; and the DUKE of NORFOLK exhibited a similar feeling when, as lord-high-steward, he passed sentence upon BUCKINGHAM.

NAPOLEON gave way occasionally to sorrow. When on his way, therefore, to St. Helena, he was sometimes seen by CAPTAIN MAITLAND totally absorbed in grief ; and once, when gazing on a portrait of his son, the tears stood in his eyes.

When the lord-high-steward told the EARL of STRAFFORD, who was condemned in 1641, that the lords designed to petition the king to remit the more ignominious part of his sentence, STRAFFORD burst into tears, and exclaimed, "My lords, your justice does not make me do this, but your goodness." Many men weep at unexpected relaxations of fortune, who would not, and could not, have wept had they been led to execution.

Nothing is more subduing to our nature than the ingratitude of children; and Shakspeare has represented its effect with sublime precision :

"You see me here, ye gods, a poor old man,
As full of grief as age, wretched in both.
If it be you that stir these daughters' hearts
Against their father, fool me not so much
To bear it tamely : touch me with noble anger,
And let not women's weapons, water drops,
Stain my man's cheeks. No, you unnatural hags,
I will have such revenges on you both
That all the world shall—I will do such things,
What they are yet I know not, but they shall be
The terrors of the earth. *You think I'll weep?*
No, I'll not weep. I have full cause of weeping ;
But this heart shall break into a hundred thousand flaws
Or e'er I weep."

JAMES II. bore all the instances of defection which his imprudent counsels had entailed upon him, with a resolution allied to fortitude; but when he heard that his own daughter (the PRINCESS ANNE) had joined the party of his adversary, he burst into tears, and exclaimed, "God help me! my own children have forsaken me."

COLUMBUS, when overwhelmed by the violence and ingratitude of men, would retire to his cabin, burst into tears of sorrow, and relieve his heart by sighs and groans; and when, after years of suffering, he was admitted to the presence of his sovereign, his long-suppressed feelings, we are told by an elegant and accomplished historian,* burst forth : "he threw

* Irving, vol. iii., 137.

himself upon his knees, and for some time was unable to utter a word for the violence of his tears and sobbings."

When HOWARD, the philanthropist, remonstrated with the lord-provost of Edinburgh on the impropriety of the prisoners having no clergyman to attend them, the lord-provost replied to his exhortations and remonstrances, that all attempts to reclaim them would have no effect. "So far from being so," answered Mr. Howard, "I do assure your lordship that, after conversing with them for a few minutes, I saw tears in their eyes."

MESSIER wept when, after having watched for the return of Halley's comet for many months, and being obliged to withdraw from the observatory on account of the illness and death of his wife, the discovery was anticipated by Montagne de Limoges. His were tears of disappointment: HANDEL's were those arising from the pathos of his art. "I have heard it related," says Shield, "that when Handel's servant used to take him his chocolate of a morning, he has often stood in silent astonishment till it was cold, to see his master's tears mixing with the ink as he penned his divine notes, which are surely as much the picture of a sublime mind as Milton's words."

BALZAC says of M. DE SCUDERY, that he moved the passions of the mind so strongly that he frequently shed tears in reading him, and that, too, in spite of himself. There must be, also, something very affecting in DE THOU's dedication of his history to HENRY the Fourth, since LORD MANSFIELD read it every year, and never without shedding tears at many of the passages.

Johnson, too, could shed tears of sympathy; and so alive was he (sometimes) to poetic beauty, that tears came into his eyes when he first read Beattie's stanza, beginning with

"'Tis night, and the landscape is lovely no more."

The tears of children and of old men are beautifully characterized by Des Cartes: "Old men often weep from affection and for joy: children rarely from delight, though often from sadness, even when unaccompanied by love." Deep grief is never clamorous: the man of sorrows, therefore, is sacred; and that we ought to be susceptible of sympathizing with him is implied by Nature having endued us with tears.* "The *glandulæ lachrymales*," says WOLLASTON, "are not given for nothing." But some griefs are too profound for tears.

The friend we have lost has gained by the change: we only have been the losers. Who would desire to outlive the last of his friends?

To fear death is characteristic of knowledge as well as of ignorance: the one from the abundance of our information, the other from the abundance of our ignorance. There is, however, a difference in the result. Ignorance *always fears*: the fear arising from knowledge is *often converted into a desire for repose*.

After faith in the ultimate justice of Heaven, the best resource in affliction is activity: sorrow grows too luxuriantly in solitude. Those whom

"The modest wants of every day
The toil of every day supplies,"

seem to mourn over the loss of parents or children only for a short time. The cause, perhaps, arises out of the reflection that a change for those they have lost must necessarily be for the better.

The measure of grief is different in different persons. This measure never can be stated, because the depths of the heart cannot be sounded. The period of grief for some is but an hour; for others,

* "Compassion proper to mankind appears,
Which Nature witnessed when she lent us tears."

JUVENAL, Sat. xv.—DRYDEN.

a day, a week, a year, or a longer period, according to the intensity or durability of each one's emotions and passions. Men of the world grieve for no one, except some portion of interest is lost; and then they grieve for the interest, and not for the person.

PLEASURE AND PAIN.

AN excellent work might be written on the illusions of youth, the perturbations of manhood, and the recollections, wishes, and anticipations of age; and this reminds me of MICHAEL ANGELO's design of the old man in a go-cart. He has a long beard, and wears the cap of a woman, over which is a hat. With one hand he rests himself; the other is on the bottom of an hourglass; the motto of the whole being "*Anchora imparo.*"

The pleasures of youth have exaggerated existences in the poetry of most men's imagination; but they want many advantages belonging to manhood, for manhood does not anticipate with so ardent an intensity, nor does it brood so deeply as in age. We are fated, however, to know that in no season of life do the passions cease to operate for many days together; and in the midst of this—so uncertain are all things—we are frequently doomed to find that it matters little

"Whether we put into the world's vast sea,
Shipped in a pinnace or an argosie."

If the old can justly reproach the young with being slaves to pleasure and a love of novelty, the young can, with still greater propriety, accuse the old of being martyrs to custom and avarice, of vainly regretting the past, and dreading the future.

If it be melancholy to see the bloom and tenderness of youth, and the energy and vigour of man-

hood, sinking into sickness, languor, and death, it is delightful to behold men like Albani, venerable in age, of a noble, grave, yet cheerful and majestic aspect, insensible to decay :

“ Adown whose neck the reverend locks
In comely curls do wave,
And in whose aged temples grow
The blossoms of the grave.”

How exquisitely delightful to the imagination is the hope, the internal assurance, that we can never actually die ! In this hope and in this assurance let us live and be happy. We are dust, it is true ; but the body only is dust ; the soul is of a superior nature !

Musing on the dead is sometimes as agreeable to our feelings as musical sounds heard of a night between sleeping and waking, or the mild murmurs of the water, of a calm summer's evening, while we are sitting near the edge of a precipice jutting over the seashore. There is a slight sensation of pain in all the three ; and a strong sensation of pleasure.

Some years ago, being near Houghton, in the county of Norfolk, we called to see the celebrated group of the Laocoon ; a counterpart, I believe, of that in the Medici gallery at Florence ; in reference to which Thomson has these expressive lines :

“ Such agonies ! such bitterness of pain !
Seem so to tremble through the tortured stone,
That the touch'd heart engrosses all the view.”

We found this group, however, not the Laocoon of Virgil, as we had anticipated ; for the poet makes the serpents tear the children, and then attack the father ; whereas the sculptor, with greater sculptural effect, makes them wind round all three at the same time. The expression of the sons indicates physical pain only ; that of the father, however, is characteristic not only of physical, but of mental pain : and here the question presents itself, which is the more difficult to bear, bodily pain or mental pain ?

Our state in infancy proves that we come into a world founded on a system of good and ill, pleasure and pain. Those who labour under severe bodily evils do not pray for a change to mental evils, nor those afflicted with mental evils pray for a change to bodily ones. Mental pain frequently leads to suicide; and yet, before mental pain can be felt at all, where there is a great bodily one, the latter must be first removed. From this it is evident that bodily pain is more acute than mental pain, and yet the latter appears to be the more insupportable.

Thus no one commits suicide under the apprehension of a dangerous operation, because a hope exists that the operation will alleviate the pain. Thousands, however, commit suicide in the apprehension of evils allied to vanity, and that even the most insignificant vanity.

The origin of pain I shall not discuss. The Great Being is not to be measured by a human standard: "My ways," is his language, "are not your ways."

There is a curious reciprocity in effect in regard to the pains of mind and body. Physical pain relieves mental pain, and mental pain relieves physical pain. Does this prove identity? or does it not rather imply the separate existence of body and mind?

Formed as we are, pain is to pleasure what darkness is to light. Nay, an excess of light is more insupportable than darkness itself; and did the sun perpetually shine on our hemispheres, though a practical knowledge might be had of the infinitely little, we could have none whatever of the infinitely vast. Our upward view would be confined to the clouds. As it is, the Eternal speaks in every star, in every wave, in every leaf—in every act and impulse, too, of the mind.

For my own part, I often reflect on the last words of Schiller: "*Calmer and calmer; many difficult things are growing plain and clear to me. Let us be patient!*"

Pleasure and pain melt into each other, as exha-

lations from the earth become blended and neutralized by the heats of summer, and the frosts and drying winds of winter :

“ Hence is it, we have scarce an hour of life
In which our pleasures relish not some pain,
Our sours some sweetness.”

We might, indeed, almost say of them,

“ Each gives to each a double charm,
As pearls upon an Ethiop’s arm.”

When misfortune operates well, it is more to be admired than prosperity. But occasional successes, nevertheless, are re-enforcements to virtue, more than equal to armies of reserve in days of battle. It cannot be denied that great wickedness often springs up in the heart of man elevated by success. Hence apparent evils may become inestimable benefits, and apparent benefits may engender evils neither to be endured nor overcome. Great fortunes, indeed, are often ruined by the same passions that concur to raise them ; and this is one of the reasons why great promotions do by no means conspire to men’s felicity, producing rather

“ Vexation, disappointment, and remorse.”

Dr. Young truly says of misfortune,

“ ’Tis the kind hand of Providence, stretched out
’Twixt man and vanity.”

In the midst of all our trials, it is well to remember what was said by Solon, that if every one should bring his evils to be cast into one mass, every one would carry his own troubles home, rather than throw them away and select an equal number from the general heap.

I cannot fathom the designs and purposes of a man whose actions I know, whose character I can scan, who stands full before me, and is subjected to the utmost scrutiny of my gaze. Shall I, then, think to fathom the deep councils of a Being whom no one yet has seen, and whose works a Galileo, a Kepler,

and a Newton contemplated with wonder and astonishment? Surely I cannot. But I can submit to his dispensations, and discipline my mind in a full expectation that he will convert such evil in the end into essential good. This is all I can say, and in this conviction I contentedly rest.

THE GREAT CHANGE.

How beautiful and affecting are these lines!

"Years following years steal something every day;
At last they steal us from ourselves away."

Bentham left his body to the surgeons, and he was dissected according to his will. Sir Humphrey Davy, on the contrary, gave strict injunctions that, in regard to him, no anatomical examination should take place. He had a dread of *post mortem* inspection; for he considered it possible that sensation might remain in the animal fibre after the loss of irritability, and the power of giving proof to others of its existence.

The first idea of life is its being a principle of self-preservation; the next, that it is a principle of action. It exists in every part of an animal body. In death, the action of the capillary vessels is the first to fail; of the brain, the sensitive function is the first, the vital the last.

The stimulus of dying does not always conquer the faculties till the last moment; for in the last moments of some, the life, not only of the affections, but of the understanding, exists complete and unimpaired.

And here we may be pardoned a few words in respect to our bodily change. Our existence is dependant on a succession of changes. The body undergoes them perpetually. It is not the same body at forty that it was at ten, twenty, or even thirty.

Not a single particle of what constituted our frame at five exists perhaps at twenty, and at death the whole will doubtless enter into new combinations.

Love and Death are Nature's greatest ministers. The one calls us into existence, the other calls us from it. Happy are those who arrive at the end of their journey with a serene countenance, calm and assured

"That true existence has not yet begun."

Seneca was accustomed to say, that if every man would speak as he ought, he would confess that many of the things he feared were far better than those he prayed for; and this assuredly may be applied to death, since a just consideration in respect to that makes all the miseries of life comparatively easy.

It is certain that men value existence more and more the shorter the vista of life becomes, like the spells of a magician, which were believed to increase proportionately as the circle narrowed.

I cannot say this myself. To me, death has long ceased to be a phantom of darkness, silence, decay—a heap of ashes, and a scene of destruction. The more frequently I gaze on its ensigns, and meditate on the resuscitation that will follow it, the less offensive does its contemplation become, as the sting of the scorpion pierces less and less painfully at every repetition. I gaze on a funeral more like a child than a man. The procession moves and the bell tolls, more to please and delight than to threaten and appal. I have tears only for those that survive.

Death seldom strikes all the organs at once. They are generally attacked separately, and the lungs are the last to surrender their functions.

Death is so mild a friend that he gives not a single pang, those contortions which sometimes precede men's last moments being pains only to the eye of observers. Muscular motion often survives

sensation.* We quit the scene as we entered it, compulsively and unconsciously ; and,

" Ere we can feel, the friendly stroke is o'er."

Why, indeed, should we consider death an evil of such gigantic magnitude ? Is it an unconquerable feeling implanted in our bosoms by the hand of Nature ? or is it the more probable effect of early association and of vitiated education ? I am inclined to believe, that were we, when children, taught to consider death only as a cavern, through which we must necessarily pass in our road to a happier region ; did we, in our manhood, look upon death as the sister of sleep and the mother of rest ; were the unfortunate to hail it as a refuge from trouble, and the old as a translation to another country, where their youth would be renewed and rendered eternal : did we, in the different stages of our existence, thus contemplate it, should we not hail this King of Terrors as a friend rather than as an enemy ?

It is curious, that the only ancient gem extant, personifying death, represents him as dancing to the music of a flute ; and when the poets would allegorize a child dying in its bud, they fable Aurora stealing it from the arms of its parents. "The gods," says Seneca, "conceal the happiness of death in order to induce us to live ;" and Juvenal directs us to pray for a mind which considers death as a consummation most anxiously to be wished. "Were our eyes," said Madame de Staël, on the death of her father, "permitted to take a clear view of the opposite shore, who would remain on this desolate coast ?"

* Sir Henry Hallford and Dr. Roget are both of opinion that, before the commencement of the last scene, the power of feeling has wholly ceased, and the physical struggle is carried on by the vital powers alone, without any consciousness on the part of the patient : "whose death," says the latter, "may be said to precede for some time that of the body."—See his noble work on *Anim. and Veget. Physiology*, vol. ii., p. 224.

Porphry says of the Brachmans that they looked for nothing so eagerly as this consummation, considering life in the light of a pilgrimage ; and Herodotus and Strabo speak of nations who mourned at the birth of an infant, and rejoiced at the prospect of death. Lucan informs us that the Celts esteemed it a passage to long life ; in consequence of which, they eagerly sought it in battle. Valerius Maximus even assures us that the Gauls were so confident of immortality, that they not unfrequently lent money to be paid *in a future state*.

Diodorus relates, that when Dionysius the elder took Rheggio, he resolved to make an example of the governor, for having defended the city with so much obstinacy. Previous to executing the punishment designed for him, with a view of aggravating his sufferings, he told him that he had the previous day put his son and his kindred to death. The tyrant, however, was greatly disappointed ; for the governor, whose name was Phytton, so far from exhibiting any affliction on that account, exclaimed, " then they are by one day happier than myself."

The Thracians rejoiced at a burial, which they esteemed the road to beatitude, and therefore indulged in all manner of festivities. The Wahabee Arabs regard it impious to mourn for the dead ; " that is," say they, " for those who are in Paradise." The Javanese make a succession of feasts upon the decease of their friends and relatives. One of these is upon the day of the decease ; another on the third day after ; then on the seventh ; a fourth on the fortieth day ; a fifth on the hundredth ; and the last on the thousandth. This custom is almost universal in Java. The Banyans of Hindustan have a similar practice. They have also a maxim, that it is better to sit still than to walk ; better to sleep than to wake ; better to die than to sleep. In the province of Biscay, too, great rejoicings are made at the death of persons who die before the age of maturity.

They are taken uncovered to the grave ; white roses are placed upon their heads ; there is a band of music, and the attendants signify their joy at what they call the happiness of innocence :

“ O weep not for him : 'tis unkindness to weep ;
 'The weary, weak frame hath but fallen asleep :
 No more of fatigue or endurance it knows ;
 O weep not—O break not—its gentle repose.”

Cyrus, on the bed of death, desired the Persians to rejoice at his funeral, and not to lament as if he were really dead. And Dr. Hunter, a few moments before his decease, said to a friend who attended him, “ If I had strength to hold a pen, I would write how easy and how pleasant a thing it is to die !” Tasso, too, when informed by his friend and physician, Rinaldini, that he had no hopes of his recovery, gratefully exclaimed, “ Oh God ! I thank thee that thou art pleased to bring me safe into port after so long a storm.”

Walking some time since in the churchyard of old St Pancras, to muse among the monuments, my attention was arrested by a head engraved upon a tombstone. On looking at the inscription, I found it to be that of *TIBERIUS CAVALLO*, author of different treatises on magnetism, aërostation, electricity, the nature and properties of air, and other subjects of natural philosophy. He was born at Naples (1749), and died in London (1800). I never saw this excellent man but once ; but that was to me a highly interesting interview. “ Sir,” said he, at parting, “ remember what a man near sixty tells you. The world, in itself, has little or nothing to claim the sojourn of men. *We all came into it for something : we shall all go out of it for more.*”

Men creep insensibly into age, and in the progress of transition become familiarized with its aspects and inconveniences. But death, for the most part, is as much a stranger to age as to youth. Both should so live that he may be greeted with joy whenever he comes.

BEAUTIES, HARMONIES AND

early association that hides from us the ad-
of death: for glorious, doubtless, are the
we shall hear, and the scenes we shall be-
hen death has shut the gates of life, and
opened the portals of eternity.

FUTURITY.

LORENZO DE MEDICI said to the excellent abbot Mariano, "He is dead to this life who has no hopes of another." And I think he in a great part is so. It was our comparative insignificance, when placed in comparison with the mighty whole, which first induced Lord Byron to imagine that our pretensions to immortality might be overrated. But he should have remembered that, with the Eternal Being, as nothing is great, so nothing is insignificant or small. "We are born with the desire and means of improving ourselves," said Pascal, "and this is a proof of the change to which we are destined."

A calm and steady purpose on which to fix the intellectual eye, is necessary for a victory over sorrow, as in the midst of torment there is always relief from bodily exercise. Plunged in action, we feel as if we had neither power nor time to die. Then again come grief and pain: death looks us in the face; hope quickens;

"The triumph and the trance begin,
And all the phoenix spirit burns within."

Some deny the immortality of the soul, because they cannot imagine its existence separate from the body. To such we may safely reply, by asking them (with Cicero), "Can you imagine what it is when *united to the body*?"

Where the uninstructed eye contemplates annihilation, the chymist recognises nothing more than decomposition, unity with other substances, or

changes of the same materials into other forms. Annihilation in the material world is never once dreamed of. Why, then, should it be in the spiritual? We might as well imagine that silex and alkali cease to exist because they are converted into glass.

Pope said to Spence a short time previous to his death, "I am so certain of the soul's immortality, that I seem to feel it within me, as it were, by inspiration."

After traversing the universe in my imagination, and the visible phenomena of this world in particular, every analogy, from the material to the mental, proves to my conviction, as clearly as any diagram in geometry, that our state of imperfection is a consequence of our being in a state of progression; that our present frame is not essential to our existence; and that a future state is absolutely necessary to the justification of Providence.

Mind is an integral part of the universe—perhaps the most essential part. That it exists is even more certain than that what we call matter exists. It is more wonderful in its construction and operations, and therefore more difficult to analyze and compress. All things in Nature whisper the secret, "You shall never die: but you shall be changed."

A short time since, at a coffee-house in Bath, I heard a gentleman near seventy make the following remark: "I do not see so much benevolence in the creation as you do. The chief that I recognise are skill and power. Nature makes beautiful objects apparently only to destroy them, and those who are called virtuous only to permit them to be miserable." "I am glad you put in the word *apparently*," said a gentleman who sat opposite. "If things began and terminated only as we see, I might, perhaps, judge of them as you do. But we see the outsides of things only. We know no more of fix-

ed results than we do of original causes. Wait, and be modest."

But let us enter a little farther into the subject of those hopes which are so finely exemplified, among other analogies, in the rise and decay of the year, and which so loudly proclaim the truth of that doctrine which teaches, in strong and indubitable language, the certainty of a future life, and the renovation and immortality of the pious and the just.

Admirable as are all the works of Nature in combination and in detail; beautiful as are the woods, streams, and vales; sublime as are the rocks, the mountains, and the ocean; and wonderful and various as are all their respective inhabitants, how far inferior are they, individually or collectively, to that grand masterpiece of Nature, MAN!

Shall a being with such capacities for reasoning be merely a being of yesterday and to-day? Shall he in whom so many perfections are concentrated cease to live at the moment he begins to know the value of existence? Is this the end for which we were designed? Are the pains and penalties of existence created for no more elevated an object than this? Where, then, are the uses of those finer operations of the mind which so dignify our being? Why were all those capacities implanted in our nature, if we are not, in reality, heirs to immortality? If not immortal, how profound the fall of human intellect! The power of anticipating the future and of reasoning on the past are but worthless qualities if they are to be chained to this body, and are formed but for this present existence.

But it is not to be conceived that a Being so infinite in power and intelligence should make man so miserably incomplete. Horrible indeed were it if such were the prospect of human destiny! Can the Universal Creator be a countenancer of injustice? Yet, if there be no future existence, when the lamp of life glimmers on the grave, where shall

the good man look for consolation ? He may have received no reparation for the many injuries and misfortunes he has endured. Where, then, would be the justice of Heaven, were his soul to die with his body ? And whither must have flown all our ideas of infinite power and of infinite excellence ? Without immortality, age has no futurity on which to build its hope and confidence ; for it is the idea of immortality which alone compensates for our sorrows, and renders the condition of humanity in the smallest degree intelligible. To be born is assuredly a high privilege, and yet many men there are who would say of life what Regnard said of a journey into Lapland : “ I would not but have made it for all the gold in the world ; but which, for all the gold in the world, I would not make again.”

Not only may we

“ Hesitate to live,
To feel what dotage and decay can give,”

but, were it not for an elevated idea of immortality, who would not rather be a plant, a fossil, or a mineral, than be dignified with the form and the feelings of a man ? Living only in the expectation of dying, the charm of immortality constitutes the greatest portion of our happiness. Being a subject over which the soul never desires to slumber, to doubt it were to possess the incredulity of an atheist. To disbelieve in the eternity of the soul is almost equivalent to being afraid to meet it, as the denial of a God is often the frequent result of having previously wished it.

“ That the soul is immortal,” said Mr. Fox, a short time previous to his death, “ I am convinced ! The existence of a Deity is a proof that spirit exists ; why not, therefore, the mind of man ? And if such an essence as the soul exists, by its nature it may exist forever. I should have believed in the immortality of the soul though Christianity had nev-

er existed. But how it acts, as separated from the body, is beyond my capacity of judgment."* How many statesmen are there at the age of eighty, who would not barter all their acquired dignities and wealth for the privilege of escaping a conviction of that beautiful yet awful truth!

The petals of some flowers fall as soon as they expand; the ephemeron, after three years of preparation, is produced, grows, extends its members to maturity, lays its eggs, and dies. But the soul—the standard of man, and to increase the perfection of which almost everything seems to combine—ives to eternity: that eternity which Boëthius defines a perfect possession of an interminable existence, and which Censorinus calls an infinite duration; but which, strictly and plainly, means an endless possession of a perpetual present.

Alcmeon esteemed the soul to be a portion of the divinity. The fable of Saturn implied as much; and since the name of Saturn meant "first intellect," every intellect returning into itself, we may recognise great beauty in the fable of Saturn's eating his own offspring. This doctrine, though it originated with Plato, is entirely inconsistent with that of the Alexandrian Platonists, most of whom taught that the soul is united to the body for its punishment, and that the body is the soul's sepulchre. Some, among whom we may class Origen and Clemens Alexandrinus, believed that the connexion of the soul with the body was supported by

* Bishop Watson appears to me to have gone too far: "As a Christian, I have no doubt of a future state; as a deist, I have little expectation."—*Letter X.* Again: "I have no hope of a future state except that which is grounded on Christianity." This was also the opinion of Priestley, as it had been that of Jeremy Taylor and Bishop Sherlock.

A future state is, I think, a necessary adjunct to the perfection of the Deity. Christians feel that Christianity makes "assurance doubly sure;" but, as Mr. Fox said, "I should have believed in it had Christianity never existed."

a fine material vehicle, which separated at the period of death. Others have supposed that the soul is a light substance, in the shape of the body in all its parts, but of a nature so elastic and aerial as to be insensible of touch, bearing the same relation to the frame that music does to an instrument, or perfume to the solid substance of a flower; and that it is elicited from the body at the time of death in the same manner as vapour is called from the earth, only of such lightness as to be intangible and invisible, and of such a penetrating nature as to pass freely through all substances.

That the soul is immortal was believed by the Chaldeans and Egyptians, the Celts, the Scythians, the ancient Lydians, the Druids, the Mandingoes of Africa, the Caribees, the Buddhists of Ceylon, the Mexicans, the Japanese, and, indeed, by almost all nations.* The natives of the Friendly Islands believe the Deity to be a female, residing among the stars, and the soul to be a divinity residing invisibly in the body. The Galla of Abyssinia believe in a future state, but not in future punishments. The Sadducees among the Jews, however, disbelieved the resurrection of the dead.† That other sects have also believed the soul to die with the body cannot be denied. But this, as Burnet has said, proves nothing to the general reasoning, nor would it were a traveller able to prove, beyond the possibility of contradiction, that a nation of ten millions entertained the same belief. The world contains nine hundred and seventy-one million inhabitants; six and a half millions of whom are Jews, one hundred and fifty millions Mohammedans, one hundred and seventy-five and a half millions Christians, and

* Ælian says that in his time none of the barbarians were atheists. Simplicius, however, in his commentaries on Epicetus, states that the Acrothoites were atheists. He alludes, also, to two other nations, but he does not name them.

† Acts, xviii., 8. Mark, xii., 18.

six hundred and forty millions Pagans. They harmonize scarcely in anything, and yet they all agree in this: that, let the Deity assume what shape he will, and let the soul be of whatever nature it may, yet that a Deity exists, and that the soul lives after the present state of imperfect existence.

Some of the Asiatic philosophers imagined souls to descend even into vegetables and minerals. The 'Tartars had once' a similar belief; and the Pharisees, who were fatalists—contradicting their own doctrine by acknowledging the free-agency of man—believed that the soul emigrated into other bodies: the good into men, and the bad into beasts. The Essenes believed in predestination, leaving man no immediate power over his own actions. They conceded the immortality of the soul, but not the resurrection of the body.* The good, they conceived, were translated to the Fortunate Islands, the bad into subterranean caverns and passages. The natives of Great Benin have, as may be easily imagined, very imperfect ideas relative to the soul, but they nevertheless believe in its future existence. For when a European inquired of one of them why he paid respect to his shadow, the negro answered by demanding if it were possible that he could be so ignorant as not to know that the shadow was a man's witness, who would hereafter bear testimony, not only of his virtues, but of his crimes and defects.

The Indians imagined that when the soul departed from the body it returned to God its parent. Zeno and Zoroaster maintained the same opinion; and when Plotinus was dying, he said to a friend

* Christians believe that the body will be regenerated as well as the soul. This was the belief, also, of the most ancient of the Hebrew writers. "I know that my Redeemer liveth, and that he shall stand at the latter day upon the earth: and though after my skin worms destroy the body, yet in my flesh shall I see God."—Job, ch. xix., v. 25, 26.

who attended him, "The divine principle which has animated me is now about to return, and to unite itself to the Divine Spirit which animates the universe." The Egyptians, on the contrary, believed that the soul passed into quadrupeds, birds, and fishes, and that, after a certain era, it again animated the body of a man. This doctrine was introduced into Greece by Pherecydes, and into Italy by Pythagoras.

The Soofees of Caubul are said to see and admire the Deity in everything. Every object but him they say is illusion; all objects being but a portion of his essence, which assumes an infinite variety of shapes, the soul forming an entire union with his substance. Cicero, who in another place discourses so admirably on immortality, believed, too, that the souls of good men were of divine extraction, and that at death they became an essential part of the Divine Nature.

There is a sect among the Mohammedans, called the Zindikites, who believe neither in the providence of the Sovereign Power, nor in the immortality of the soul. But the four elements they believe to be the four essences constituting the Deity; and that, all things being compounded of them, all things are portions of the Deity himself. Spinoza, however, taught that God was neither infinite, intelligent, nor perfect, but the natural virtue or faculty diffused throughout all creatures; that nothing is spiritual; that matter and its modifications alone exist; that all ideas, abstract and general, are material; that matter, in short, is the only Deity. Spinoza's ignorance was far worse than that of the Saxon noble of whom Edwin, king of Northumberland, inquired the nature of the soul, without any of its humility: "Sire," answered the noble, "the more we reflect on its nature, the less are we able to explain its essence. We may compare it to the bird which flew in at one of the windows where your majesty so

lately dined, and immediately flew out at another. While it remained in the room we knew something about it ; but when it flew away, we knew not whence it came nor whither it went. Thus, while the soul animates the body, we may know some of its properties ; but when it separates itself from the body, as we know not whence it came, so we know not whither it has flown."

The inhabitants of New-Zealand believe, that on the third day after interment the heart separates from the body, and that a divinity, whom they call *Ea-tooa*, hovers over the grave, takes the heart, and carries it into the clouds. The Persians are said to leave one part of their graves open, from a belief that the dead will be reanimated and visited by angels, who will judge them, and appropriate their future state. Some Tartar tribes bury the best horse with a person deceased, in order that he may make use of it in the other world ; and the Laplanders place a purse of money in the coffins of their friends, that they may have wherewith to pay the porter at the gate of Paradise ; while the Hindu wife believes, if she sacrifice herself on the funeral pile of her husband, she will enjoy with him eternal felicity.

The natives of the Tonga Islands imagine that the lower orders of society have no souls, or that, if they have one, it dissolves with the body ; but that those of a higher rank go to Bolotoo, the residence of the gods. They believe, also, that the soul, during life, is not a distinct essence from the body, but the ethereal part of it ; which part exists after death in Bolotoo, in the form and likeness of the body. In Taheite the islanders believe that the spirit of man is eaten by a bird, in passing through which it becomes purified ; after which it rises to the rank of a deity. There is a tribe, on the contrary, on the Gold Coast of Guinea, who adopt the doctrine of metempsychosis so far as to believe that when they die they will be changed into white men ; and one

reason why the Mohammedans abhor having their portraits taken, arises out of another branch of the same creed, viz., that when they die their souls will animate the picture, and thus be debarred from entering the paradise of Mohammed.

A Japanese inscription illustrates the soul in the following manner: "Look at mankind. If you contemplate its state when living, its existence is no more than that of a herb, which shoots up on the face of the earth. Concerning the soul, it is like dew which hangs on the points of grass." The substance of the priest's exhortation to the soul of a person deceased is, that it should be "conscious of being the work of the Creator of the universe; and, after leaving its earthly dwelling, that it should speed its way to the source whence it issued."

The natives of Ternate, one of the Molucca Islands, exhibit little show of religion, and no one is allowed to speak upon it to a stranger. But they have temples, and the priests go thither at stated periods with an assemblage of persons, when they silently point to an inscription on a pyramid, which embraces nearly the whole system of ethics: "MORTALS! ADORE YOUR GOD; LOVE YOUR BRETHREN; AND STUDY TO BE USEFUL TO YOUR COUNTRY."

Many Japanese philosophers imagine that a universal soul pervades the whole of Nature, animating all things, and reassuming souls when they quit the body, in the same manner as the ocean resumes its waters and light resumes its particles. Others believe that the soul, at the time of the body's death, retains complete possession of all its powers, but has no faculty to exert any of them till it forms a reunion with another vehicle.

From a passage in Aristotle, it would seem that some of the Egyptian philosophers had notions similar to those of the Japanese, though other writers doubt even whether they believed in the immortality of the soul at all. It is, however, universally ac-

knowledge that the hieroglyphic denoting the soul was a chrysalis ; and though it is certain that the future butterfly lies with all its parts folded up in the caterpillar, yet the circumstance of the Egyptians having adopted that emblem is a sufficient proof that they considered the soul as undergoing frequent if not continual changes. The Greeks, in the same manner, typified it under the form of a beautiful female, ornamented with the wings of a butterfly.

At Rome there is a curious basso relievo, in which Psyche, held by Mercury, is standing over a dead child, while Prometheus is in the act of reanimating a girl by touching her head with the point of his rod.

The mind exists in the body even after the body is itself insensible. Plymley assures us that Du Gard, surgeon of the infirmary at Shrewsbury, found a patient who had injured his spinal nerve, not only to live some days, but to preserve his reason entire, though his body had lost all sensation.

That spirit may exist without matter is almost as certain as that matter may exist without spirit, after it has been once created. We lose our legs and our arms, yet the mind is as perfect as before. Thus it is with our intelligence. We may also lose our memory, our powers of discrimination, and, in fact, labour under the most abject mental imbecility, yet the vigour of the body remain firm and unimpaired.

That the soul can exist without visible matter, the soul by its own properties has the power to convince us, in the same manner as the eye has the power of estimating the height, width, and colour of the body. The soul tells this great secret by its dread of annihilation ; by its conscious superiority over the body ; its vast powers of acquiring knowledge ; its love of justice and honour, and every nobler virtue ; its ardent desire of perfection ; its persuasion that matter exists not for itself ; and by that restless activity which is continually pointing at

something beyond the limit of the present. As planets gravitate by a secret impulse to each other, so, reasoning by analogy (which, in a case like this, is, I think, an unerring guide), the soul gravitates towards a union with something partaking of a divine quality : and, as Hemsterhuis would say, a single aspiration of the soul towards something nobler and far better than itself, forms greater ground for a conviction of its immortality than the clearest mathematical demonstration. The hope of immortality seems, indeed, to be almost a reminiscence of Heaven. We see nothing in Nature superior to MAN, and nothing in man superior to the MIND ; which glances over the universe, as it were, by magic, and plans in moments what the body can execute only in years. Indeed, the mind of man surpasses every object we discern in Nature, and more difficult was it to form than even the sun itself ! It is no wonder, therefore, that the secrets of its elements should still baffle the ingenuity and research of the best metaphysicians. From Aristotle down to Locke and Berkeley, Reid and Stewart, all is conjecture !

Is it not natural to conclude that that which is the most excellent in quality, and which is the longest in arriving at maturity, should also be of the longest continuance ? Is it consistent with common sense to suppose that matter shall have a longer life than spirit, which gives activity to matter ? If we possess two substances, one of which gives us more pleasure in the possession than the other, do we not prefer the one which is the more excellent to that which is less so ? If we possess a diamond in a casket, shall we keep the casket and throw away the diamond ? And shall not the Deity preserve that portion of his works which most partakes of his own essence ? Would it not be derogatory to his nature to act contrary to this rule ? Can Eternal Wisdom act without a definite and hon-

ourable purpose? No! and the consciousness of a truth like this is the pledge of immortality. Shall St. Peter's live, and Angelo, its architect, cease to live? As well may we suppose that there are no natural causes of attraction, or that the universe would be capable of organic harmony if the Architect who created it, and who alone is capable of turning space into infinity and time into eternity, no longer existed. Yes, St. Peter's still remains unmoved, it is true, while Angelo is reported to be dead. BUT TO THE WORLD ONLY IS HE DEAD. Angelo, the great, the sublime Angelo, will continue to exist when this superb creation of his genius shall have mouldered away like the dust of its own monuments.

Marcus Aurelius Antoninus said of the soul that it was a *God in exile*. Shall a being so capable of association with the Divinity sink into nothing? We esteem it a misfortune to have lost an excellent friend; yet everything passes away, and you, my Lelius, now in health and in the bloom of life, will soon follow. But the grave has an illumination even more transcendent than that of the sun itself. That luminary, too, presents an analogy to our reasoning. It shines upon a wilderness with the same pleasure that it does upon the vales of Italy or the plains of Greece; and in the same moment that it presents to our vision the magnificence of evening, to that of others it exhibits all the glories of morning.

Atheists are the vainest and most arrogant of men! for, imagining the arguments they employ to be the most perfect of demonstrations,

"In quick and premature decay,
They breathe the fragrance of their minds away."

It is curious to observe how incredulous some men are in some things, and yet how extravagantly, nay, how miraculously credulous they are in others!

One of the most distinguishing parts of an athe-

ist's character is conceit. Wearing the "semblance, not the substance" of reason, he resembles those fruits which the gardener causes to assume the figures of animals by merely placing them in moulds of clay at the time of growing. Atheists, in consequence, are not to be reasoned out of their mental importance. A fit of illness, however, works strange wonders !

" O the good gods,
How blind is pride ! What eagles we are still
In matters that belong to other men,
What beetles in our own !"

Inoculated with arrogance, the atheist sees every object superficially : bewildered, the present is all pain, the past all calamity, the future all despair. A solitary being in this wilderness of beauty, he sits, like the 'Titans of Hesiod, in melancholy state, lost to every comfort ! His thoughts resemble those of the misanthrope, who amused the hours of his disgust in studying the anatomical mechanism of hornets' stings. He never prays, for he has no God to pray to. In life, where is his hope ? In misfortune, where is his consolation ? In the hour of death, where is his cynosure ? In ancient times the amethyst was supposed to be an antidote to inebriation ; but to an atheistical soberness of heart there is no resource from mental ruin.

We cannot conceive what is infinitely great nor what is infinitely small ; and yet atheists will, in solemn complacency, contemplate their own wisdom ; and though they will acknowledge that serpents may exist in the centre of large trees, and toads in the cavities of flints, yet, because they can not penetrate a few secrets, they will not stoop to the belief that there are more than they are themselves masters of. They do not remember that, in calculating the orbits of comets, mathematicians infer the invisible progress from the visible ones. They forget that for four thousand years the simple over-

flowing of the Nile constituted a problem ; they forget how many centuries were required to unfold the causes of eclipses, the phenomenon of the rainbow, the fluctuation of the tides, the circulation of the blood, the propagation of sounds, and the nature of vision. Atheists, in fact, resemble those persons who, in going the journey from London to Aberdeen, find themselves benighted at York, sleep there, and die. Their reasoning, as La Harpe has observed in his eulogium of Fenelon, "tears from misery its consolation, from virtue its immortality ; freezes the bosoms of the good, and renders justice only to the wicked, whom it annihilates."

Can the grasshopper measure the mountain on which it forms its nest ? Can the beaver weigh the waters of the river by the side of which she builds her edifice ? Can the lion burst the barrier which separates his strength from the intellect of his keeper ? Can the starling understand that the fruit which it names is the fruit on which it feeds ? Neither can the whale acquire the sagacity of the seal ; the cassowary the docility and imitative faculty of the bullfinch ; the caterpillar the art or the industry of the ant ; nor the fern nor the sycamore form the slightest notion of the exquisite sensibility of the mimosa. Ye atheists ! see ye not how much more strong is the eagle than the dove ; how much more provident is the beaver than the mule ; how much more sagacious is the bee than the moth ? All these ye have the power to see. But can ye reduce a globule of water to a smaller volume by compression ? Can ye weave even so much as a spider's web ? Will your chymical art convert the nectar of a flower into virgin honey ? Can ye fructify a palm-tree ? or can ye give perfume to the nectarium of a citron ? Content yourselves, then, in the poverty of your intellect. Nature, so far from admitting you to her council, has scarcely permitted you to place one footstep on her threshold. Perish, then, a system

founded on ignorance, on superficial acquirements, or on an addiction to one science, which, precluding the observance of that harmony which subsists in all, staggers belief; because, able to trace no farther, it fancies it has arrived at the limit of the chain. The molehill to an ant is almost as great a mountain as the highest summit of Peru.

Atheists resemble the geographers of antiquity, who, when they had delineated all the countries known to them, wrote on the margin of their maps, "all beyond this are dry deserts, frozen seas, and impassable mountains." And yet many of these men, though they doubt of all the obvious impressions daily and hourly before them, derive some hope to themselves from dreaming on the discovery of a universal solvent, a universal medicine, and a universal ferment which shall increase seeds, germes, and embryos to infinite fecundity! If we lead a blind man into a field, and inquire of him whether he sees the sun, he answers "No." And if we lead an atheist thither, as blind in mind as the other is in vision, and inquire of him whether he believes there is a God, he likewise answers "No!" "And why?" "Because he is nowhere to be seen." But does the blind man argue, because he cannot see the sun, that therefore there is none? A husbandman ploughing in a valley sees nothing before him but the hills which screen his hut and oxen from the storm at one season of the year, and from the heat of the sun at another. The shepherd, on the other hand, mounts the pinnacles of rocks, and beholds a boundless horizon before him: a city at his feet; an island in an arm of the sea; and beyond, a vast expanse of ocean, studded with ships, and extending farther than his eye can reach. Has not the shepherd a contempt for the husbandman when he hears him doubt the existence of a ship because he has never seen one? When he doubts, too, whether a river exists larger than his rivulet? And, above all, when he doubts

the existence of a sea more extended than that part of the heaven which covers the concave of his native valley! The atheist is the husbandman, the man of science the shepherd.

Existence of a God! It is more evident to the senses than atheists can perceive. It forms, as it were, a circle, every part of which is visible to those who occupy the centre. Doubt, on the other hand, is a pyramid, imposing in form, but susceptible of being seen only from angle to angle. When an atheist doubts, he is satisfied. When a man of science doubts, he analyzes: analysis opens light; light produces conviction: from that conviction springs neither hatred, nor fear, nor despair, but admiration, pregnant with love and awful delight. "The soul immortal?" Ay! When the bough of a shrub is cut off, will not the shrub throw out shoots in its place! When the claw of a shellfish has been injured or broken, will it not be renewed? When a worm is divided, will not its parts reunite? And shall not the soul—"The soul! where does it exist? anatomists cannot discover either its form or its habitation." Neither can they discern the fluid of the magnet. Is there not a Power which can change an acorn into an oak? a caterpillar into a butterfly? and an animal into dust? If there exist a Power capable of effecting these and similar changes, it can assuredly, with as little difficulty as there is in any of the minor operations of chymistry, reconvert that dust—if dust it ever has been—into an essence which we, in utter ignorance of its nature, designate spirit.

We know nothing by ocular demonstration of the soul's flight, neither do we know the uses or the means employed by Nature in many of her operations. We do not know the uses of the dreams of men; we are at a loss for the uses of the zebra and the camelopard, of the hunch of the dromedary, and of the enormous excrescences of the

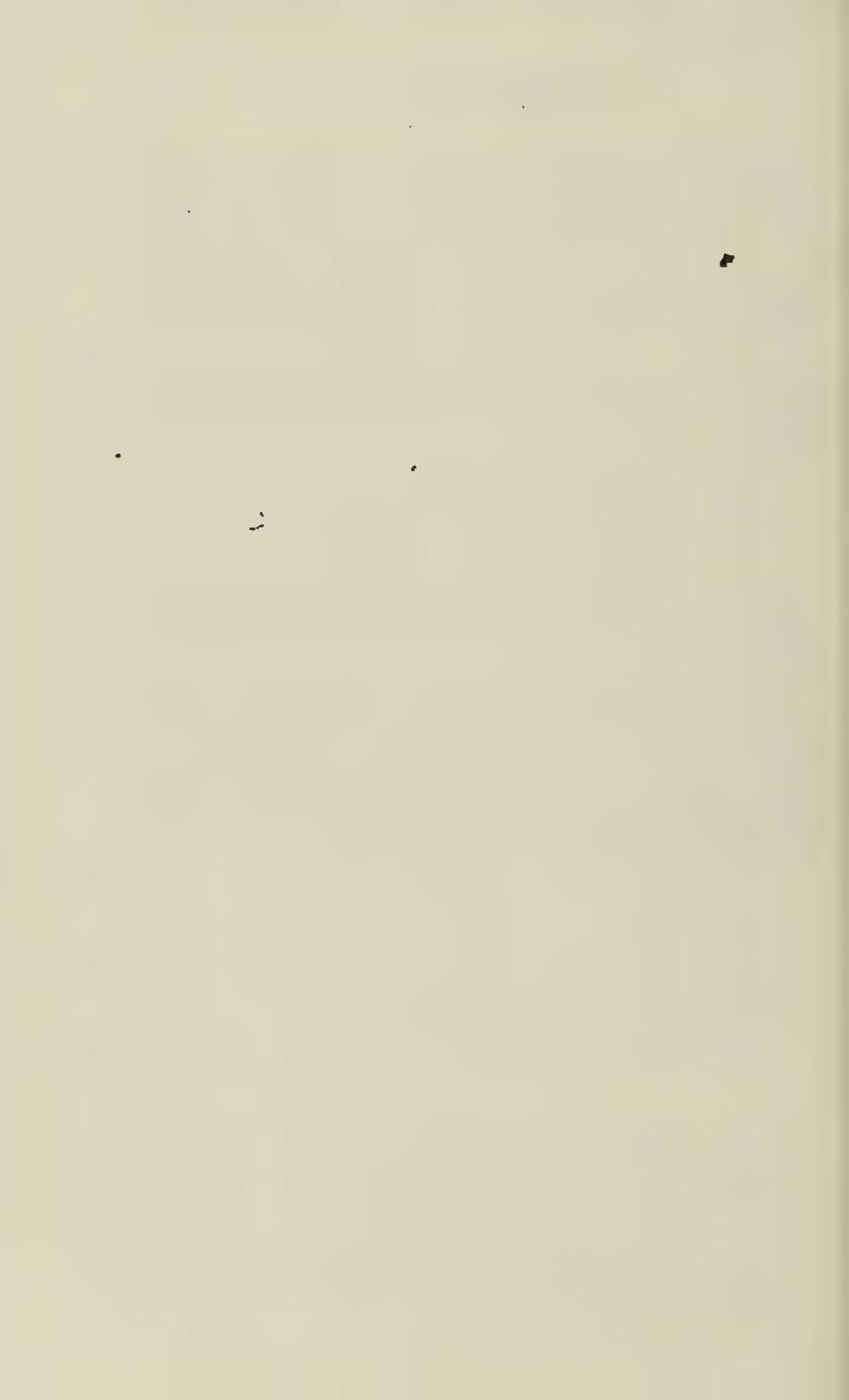
hornbill and the toucan. We are ignorant of the uses of zircon and glucine; two of the simple earths; we are ignorant of the process by which the diamond is crystallized; and we are equally ignorant of the end for which insects undergo their respective changes. Yet we know that all these things are. Let the good man, then, calculate on the power and justice of the ETERNAL, who, in time most fitting for the purpose, will not only elicit the soul from the body, but convert its present anxious condition into a Sabbath of eternal rest.

“ Feign'd is the pleasure that appears,
And false the triumph of our eyes;
Our draughts of joy are dash'd with tears,
Our joys, imperfect, end in sighs.”

For my own part, I regard death as I do those waters which flow for many leagues under the earth, and then suddenly burst forth into open day to fertilize all the land.

To feel thus is to feel assured of immortality. To feel thus is comparatively to be advanced a thousand steps towards perfection: virtue becomes more agreeable; the past more capable of understanding; the present more endurable; and the future pregnant with hope and admiration.

THE END.



ABBOTT'S HISTORIES

IN COURSE OF PUBLICATION

By Harper and Brothers, New York.

. Each Volume of this Series is printed and bound uniform with the other Volumes, and is adorned with a richly-illuminated title-page and numerous Engravings. 12mo, Muslin, plain edges, 60 cents per volume; Muslin gilt edges, 75 cents per volume.

Mary Queen of Scots.

This history is given here minute in every point of real interest, and without the encumbrance of useless opinions. There is no sentence thrown away—no time lost in mere ornament. Perhaps no book extant containing so few pages, can be said to convey so many genuine historical facts. There is here no attempt to glaze over recorded truth, or win the reader by sophistry to opinions merely those of the author. The pure, simple history of Queen Mary is placed before the reader, and each one is left to form an unbiased opinion from events impartially recorded there. One great and most valuable feature in this little work is a map of Scotland, with many engravings of the royal castles and wild scenes connected with Mary's history. There is also a beautiful portrait of the Queen, and a richly illuminated title-page such as only the Harpers can get up.

—*National Magazine.*

Queen Elizabeth.

Full of instructive and heart-stirring incident, displayed by the hand of a master. We doubt whether old Queen Bess ever before had so much justice done to her within the same compass. Such a pen as Jacob Abbott wields, especially in this department of our literature, has no right to lie still.—*Albany Express*

Charles the First.

We incline to think that there never was before so much said about this unfortunate monarch in so short a space ; so much to the purpose with so much impartiality ; and in such a style as just suits these for whom it is designed—the “two millions” of young persons in the United States, who ought to be supplied with such works as these. The engravings represent the prominent persons and places of the history, and are well executed. The portrait of John Hampden is charming. The antique title-page is rich.—*Southern Christian Advocate*.

Hannibal the Carthaginian.

A new volume of the series projected by the skillful book-manufacturer, Mr. Abbott, who displays no little tact in engaging the attention of that marvellous body “the reading public” in old scholastic topics hitherto almost exclusively the property of the learned. The latter, with their ingenious implements of lexicons and scholia, will be in no danger of being superseded, however, while the least-furnished reader may gain something from the attractively-printed and easily-perused volumes of Mr. Abbott. The story of Hannibal is well adapted for popular treatment, and loses nothing for this purpose in the present explanatory and pictorial version.—*Literary World*.

Maria Antoinette.

In a style copious and yet forcible, with an expression singularly clear and happy, and in language exceedingly chaste and at times very beautiful, he has given us a plain, unvarnished narrative of facts, as he himself says, unclogged by individual reflections which would “only encumber rather than enforce.” The present work wants none of the interest inseparably connecting itself with the preceding numbers of the same series, but is characterized throughout by the same peculiar beauties, riveting the attention and deeply engraving on the mind the information with which they every where teem.—*Evening Mirror*.

Alexander the Great.

The history of Alexander the Great, as penned by Jacob Abbott, will be read with thrilling interest. It is profusely embellished, containing maps of the Expedition of Alexander, of Macedon and Greece, the plain of Troy, the Granicus, and the plain of Issus; and engravings of Alexander and Bucephalus; Paris and Helen; the bathing in the river Cydnus; the siege of Tyre; Alexander at the siege of Susa; and the proposed improvement of Mount Athos. It is written in a most graphic and attractive style.—*Spectator*.

Charles the Second.

A valuable engraving of Lely's portrait of Cromwell opens the book, and there are several illustrative wood engravings and an illuminated title-page. This is a comprehensive and simple narration of the main features of the period during which Charles the Second reigned, and it is done with the clear scope and finely-written style which would be expected from the pen of Jacob Abbott—one of the most able and useful literary men, as he is one of the very best teachers of his time.—*Hewe Journal*.

Julius Caesar.

The author seems gifted with that peculiar faculty, possessed by so few, of holding communion with and drawing out ardent imagination and budding genius, and at the same time of directing both into the great channel of truth. The labors of such a man are productive of incalculable good, and deserve the highest reward.—*New Hampshire Patriot*

Richard the First.

Mr. Abbott's entertaining and instructive historical works are becoming more and more popular, and are undoubtedly among the best of the many condensed histories that have been written. For young people we know of nothing more entertaining or better calculated to excite a desire to become acquainted with the leading events of history.—*Buffalo Courier*

Richard the Third.

We know of no writer in this country whose style and ability better fit him for such a service. They are admirable works for youth, and make a valuable fund of reading for the fireside and for schools.—*New York Evangelist*.

Alfred the Great.

History, under the pen of Mr. Abbott, discloses its narratives and utters its lessons in a style of great simplicity and intelligence, and, above all, with no danger of detriment to morals. He has selected his field with excellent taste, and we shall be glad to see his series pursued in definitely. In their line, these volumes have never been surpassed.—*Baptist Recorder*.

Darius, King of Persia.

Mr. Abbott's design to write a succession of histories for the young is admirable, and worthy of all encouragement, and the manner in which he has executed his work thus far is most excellent. Let him be encouraged to proceed till he has reached the last volume of history, that the coming generation may turn from the world of romance to that of reality, and learn that what is and has been is as brilliant in character, as glorious in description, and as captivating in detail, as that which the genius of fiction ever created.—*Observer*.

William the Conqueror.

These historical memoirs by Mr. Abbott are marked by their great impartiality, condensation of facts and picturesqueness of style; his practiced and elegant pen has, in *Mary Queen of Scots* and *Charles the First*, invested the historic page with the brilliancy and fascination of romance.—*Mirror*

Terres the Great.

"The grand excellence of these little volumes is, that those points of history which involve the principles, the causes of human action, and which too often receive but little attention from those who write for youth, are brought forward into their proper station and so successfully treated, that the weakest capacities may become interested and stronger ones profited. The maps and engravings, of which there are many, add much to their value."

KINGS AND QUEENS;

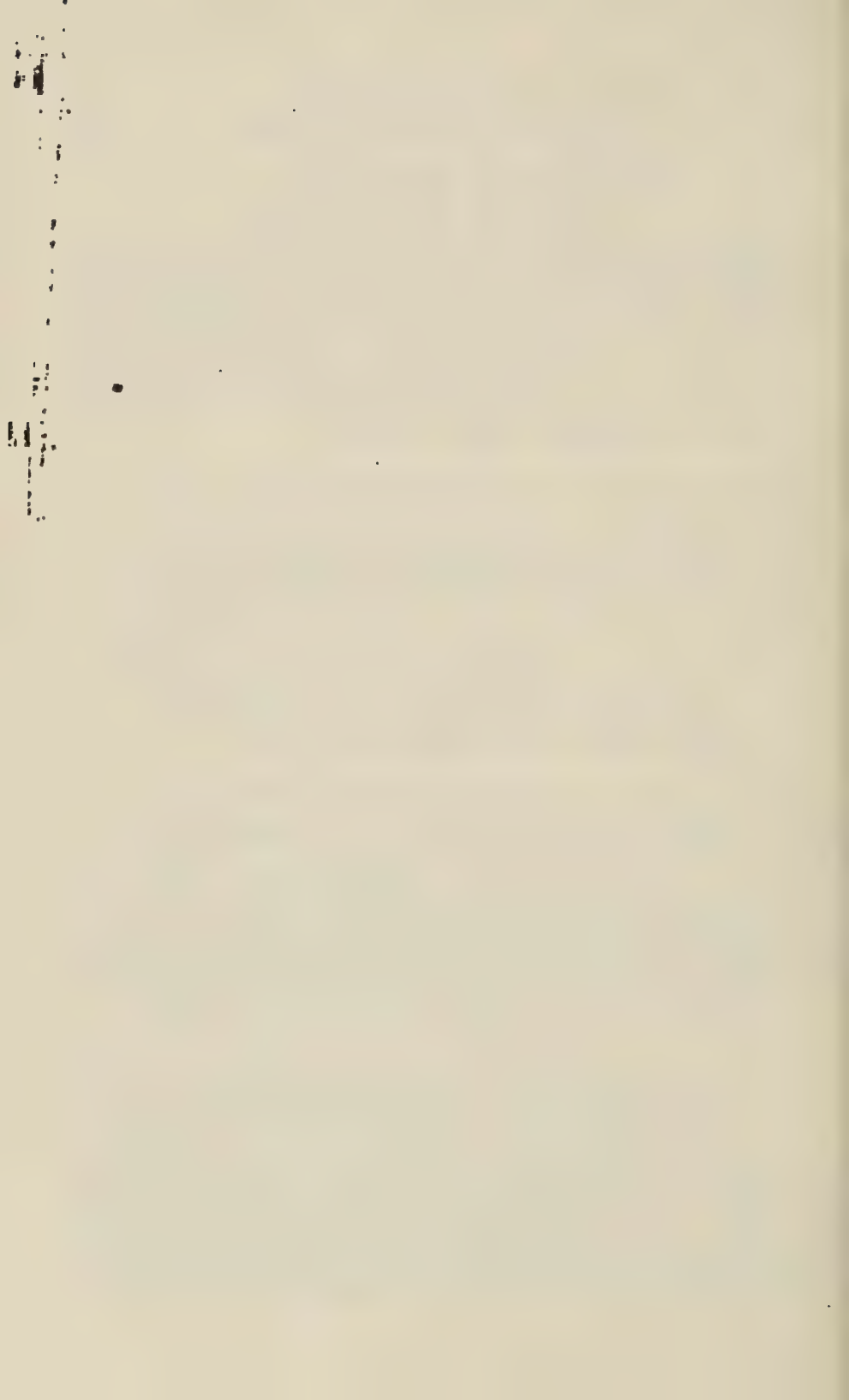
OR, LIFE IN THE PALACE: CONSISTING OF HISTORICAL
SKETCHES OF JOSEPHINE AND MARIA LOUISA, LOUIS
PHILIPPE, FERDINAND OF AUSTRIA, NICHOLAS,
ISABELLA II., LEOPOLD, AND VICTORIA.

BY JOHN S. C. ABBOTT.

With numerous Illustrations. 12mo, Muslin, \$1 00.

These sketches of the most distinguished personages of Europe are drawn by a master hand, and with the life-like distinctness which characterizes all the works of the popular author. The work is full of romantic interest, while at the same time its perusal will enable the reader to understand the present state of Europe and of the crowned heads who form an essential part of its shifting pageantry.—*Ladies' Wreath.*

Brief, but very comprehensive and glowing sketches of eminent sovereigns are comprized in this beautiful little volume. The present political posture of some of these characters, and the wonderful incidents connected with others, give this work almost the air of a romance, so eventful, stirring, and unexpected is the history of their lives and fortunes. The views of Mr. Abbott are those of a thoughtful, conscientious, well-read man; and are far more trustworthy, to those who desire to know the real truth of history, than the representations of many historians who pass for standard authors.—*Evangelist.*



THE UNIVERSITY OF MICHIGAN

DATE DUE

FEB 03 1983
FEB 03 1983

NOV 10 2004

UNIVERSITY OF MICHIGAN



3 9015 03108 4497

**DO NOT REMOVE
OR
MUTILATE**

THE UNIVERSITY OF MICHIGAN

DATE DUE

FEB 03 1993

NOV 10 2004



UNIVERSITY OF MICHIGAN

